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FRC 2019 participants raised over $30,000 for our 2019 charity, The Gift Of Swimming. Thanks to everyone in the remediation industry who contributed to our success this year.

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Florida algae task force releases report

By ROY LAUGHLIN

The state's Blue-Green Algae Task Force released its first report in October, a modest but succinct list of recommendations to reduce the frequency and manage the severity of harmful algal blooms in Florida waters.

Not surprisingly, the report put the finger on the "increased delivery of nutrients to Florida's water bodies … as the primary driver of algal proliferation and subsequent degradation of aquatic ecosystems."

The report also cited land use changes, alterations in hydrology, and increased temperatures and variability in precipitation associated with climate change as significant contributors to nutrient transfer from land to surface waters.

The report recommended specific actions be taken in eight categories.

BMAPs

Currently, Florida's water quality standards are regulated through basin management action plans intended to ensure compliance with numerical nutrient standards. The standards are required under a court-mandated consent agreement.

The task force criticized the strategy in use for its underfunding. Even willing local partners are frequently "unable to execute projects," the report alleged.

Perhaps more critical, the "effective-

ALGAE
Continued on Page 13

Photo courtesy of Kinsley McEachern

Kinsley McEachern, University of South Florida at St. Petersburg, collects discrete water samples from Tampa Bay for a microplastics study. McEachern, along with a researcher and students from Eckerd College, produced the first extensive quantitative study of microplastics in Tampa Bay. See story below.

Microplastic particles found in large numbers in Tampa Bay water, sediments

By ROY LAUGHLIN

Marine microplastic pollution refers to small particles of synthetic polymers in water and sediments.

During the last five years, much of the available microplastic contamination data has come from studies in which investigators found microplastics and, in some cases, identified the chemical composition and/or origin of the particles found.

A recently-published study of microplastics in Tampa Bay added concentration numbers to the marine microplastics narrative for the first time.

Researchers collected 4.5 ± 2.5 microplastic particles per cubic meter of water. In sediment, the concentration was much greater, 600 pieces of microplastic per pound of dry sediment, or 280 ± 290 particles per cubic meter of sediment.

Researchers sampled 24 sites around Tampa Bay. They calculated that there are about three trillion pieces of microplastics in the sediment and one trillion pieces in the water, totaling about four trillion particles throughout the ecosystem.

Small pieces of synthetic textile threads were the dominant microplastic material found—more than 75 percent of all microplastic particles collected in the bay.

The source of the small thread pieces is likely laundering wastewater. The fibers that pass through the filtering process of some wastewater treatment plants are discharged into the bay.

Other textile degradation processes may also contribute some of the microplastics.

The researchers found that "intense rainfall events in the summer always preceded samples with substantially higher counts" of microplastics.

The researchers' collection data showed that samples that exceeded twice the average microplastic tally of all samples correlated with high rainfall events occurring within a week before sampling.

The correlation between greater microplastic fiber abundance and rainfall was seen in samples taken from both

MICROPLASTICS
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A look back at highlights from FRC 2019

By ROY LAUGHLIN

FRC 2019's perfluorinated compounds session was provocative this year as the focus shifted from curating and reviewing existing information to a more critical analysis of recent research and plans for standard-setting and cleanup techniques.

The session's first speaker, Karla Buechler, corporate technical director at Eurofins TestAmerica in West Sacramento, CA, characterized current analytical methods as "archaic."

The U.S. Environmental Protection Agency has an analytical method for drinking water that is minimally reliable and will bias results toward the lower end.

In response to a question, Buechler said she doubted that the U.S. Environmental Protection Agency would stick to its proposed regulatory schedule, even after tasking its Office of Water with the lead on the PFOA initiative announced this spring.

Another take-away from Buechler's talk is that the ubiquitous PFOA compounds often co-occur at contaminated sites with plasticizers. PFOA compounds' resistance to chemical destruction may make site remediation of mixed media contamination a much more complex technical operation.

If the expected low cleanup targets are eventually established, reaching the necessary levels will become still more challenging.

William Kerfoot, PhD, principal

FRC
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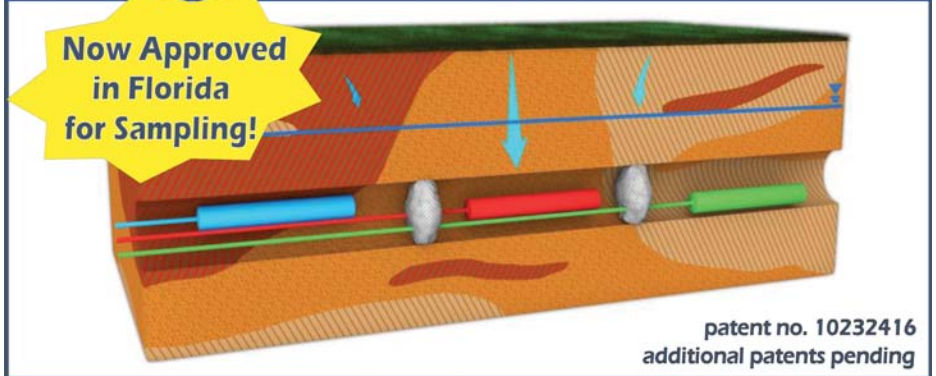
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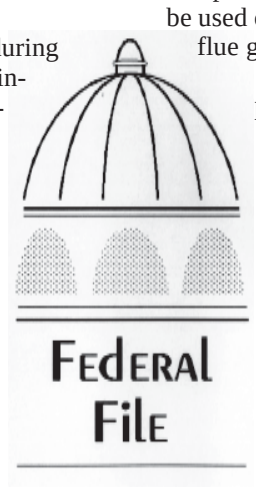
EPA delays rule for coal ash impoundment cleanup, residuals management

Staff report

In November, the U.S. Environmental Protection Agency announced it will delay electric utilities' compliance deadlines for coal impoundments and rules for the handling of coal ash residuals.

The rule, passed in 2015 during the Obama administration, is intended to prevent the contamination of ground and surface waters. It requires that lined disposal pits not be in contact with aquifers for long-term storage. It also restricts the use of coal ash for fill dirt and similar uses.



The proposed rule delay will give most coal ash producers until Aug. 31, 2020, to shut down or retrofit unlined ash pits.

For some facilities, the new rule proposes an additional three years to meet impoundment requirements.

The new rule also affects wastewater handling at coal plants and impoundments.

The deadline to meet new wastewater disposal standards will be extended to 2028. Wastewater, in this case, refers to water drawn from the ash pits to prevent overflowing. Rain events are often the cause of pit overflows.

Impoundment water from these pits can be used or recycled to scrub solids from flue gas.

The 2015 rule required 100 percent recycling of ash pit water. The delay until 2028 is contingent upon impoundment operators demonstrating that they are taking voluntary measures to prevent chemical contaminants such as arsenic and mercury from escaping the storage impoundments.

The Trump administration, in response to industry pressure, initially proposed to delay rules until some unspecified future date. A court decision last year required EPA to formally define a schedule for utilities to meet the delayed deadlines.

The *New York Times* reported that EPA estimated the rule affects about 1,000 coal pits and ash ponds, and thousands of additional sites where ash has been buried. Researchers have found that the vast majority of these coal pits leach contaminants to some extent to nearby groundwater or surface waters.

A recent study by Avner Vengosh, PhD, professor of earth and ocean sciences at Duke University, looked at the release of coal ash contaminants in three different U.S. regions where coal is mined and thus is a primary electricity-generating fuel.

His research demonstrated extensive mobilization of arsenic, selenium and chromium-6, the toxic form of that element. Vengosh noted that extensive coal ash releases to surface water raises the water's pH, making the toxic forms of those elements more abundant.

His research, as well as comments from environmental advocacy organizations such as Earthjustice, criticized the 2019 proposed rule delay noting that the unrestricted placement of coal ash for proposed "allowable beneficial uses" will contaminate surface water, groundwater and drinking water sources with dangerously elevated levels of toxic elements leaching from the ash.

Florida has few operating coal-fired power plants left in full operation. This new rule will affect those recently closed by perhaps extending the deadline for owners to clean up coal ash impoundments, and find beneficial uses for the ash from the unlined pits and closed plants.

War on science continues: More advisory panels disbanded. This summer, the Trump administration announced its intention to reduce by one third the number of environmental committees advising different departments and agencies. The announcement came with guidelines that set an October, 2019, implementation date.

Two of the final advisory committees were shuttered at the end of September.

The National Oceanic and Atmospheric Administration's Marine Protected Areas Federal Advisory Committee, established in 2003, is no longer funded.

The second, the U.S. Department of Interior's Invasive Species Advisory Committee that has been in operation for about a decade, was also disbanded.

These committees were largely composed of scientists, including government scientists, and academics.

A NOAA spokesperson said that the work provided by its now defunct Marine Protected Areas committee would be provided by other surviving advisory boards responsible for similar efforts.

The other committee, Interior's Invasive Species Advisory Council, had a very significant focus: the prevention of invasive species passage through U.S. ports of

FEDFILE

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FPL's SolarTogether takes another step towards implementation

Staff report

Florida Power & Light Co.'s plan to launch the largest community solar program in the country, SolarTogether, received a boost this fall.

A joint motion was filed between FPL, the Southern Alliance for Clean Energy, Vote Solar and Walmart revising the utility's program tariff to increase the benefit for all customers, allocating an increased share of the system's benefit to customers that choose not to participate.

If the agreement is approved by the Florida Public Service Commission, FPL plans to install 1,490 megawatts of new solar at 20 new power plants within their service territory over the next two years.

FPL estimates the program will generate an estimated $139 million in net savings for customers over the long term.

According to the utility, participating customers will receive a direct credit on their monthly bills. Customers may subscribe to the program in kilowatt increments up to their annual kilowatt-per-hour household load.

The customer will then receive an increase in kilowatt credit value over time.

FPL anticipates that subscribers will realize an economic benefit on their bills in the seventh year of their subscription.

SolarTogether is another step in the state's slowly developing effort to take the lead in U.S. solar power.

SACE projected that Florida will leapfrog the current regional leader, North Carolina, in total solar development in 2021 based on announced solar commitments.

DEP moves to approve controversial drilling. In late October, the Florida Department of Environment Protection issued notices of intent for well drilling permit requests #1374 through #1379 to Cholla Petroleum Inc. for oil and gas drilling in Calhoun County.

The proposed Cholla wells are exploratory. Should oil and gas be found in sufficient quantity for production, additional permitting would be required.

The proposed wells are located between Dead Lakes and the Apalachicola River approximately four miles southwest of Marysville. Cholla intends to advance the wells to between approximately 13,500 and 14,200 feet.

DEP received numerous complaints from citizens and environmental advocates requesting denial of the permits due to the sensitive nature of the ecology in the Apalachicola River Basin and the wells' potential impact on potable surface and groundwater supplies.

The Apalachicola Riverkeeper submitted comments to DEP opposing the wells noting that the Apalachicola River Basin is the most environmentally sensitive undisturbed floodplain ecosystem in the state. The river is designated as an Outstanding Florida Water.

"The risk of damage to water quality, biologic and geologic integrity of the ecosystem from oil drilling far exceeds any benefits that a small number of property owners and an oil company will gain," wrote the Riverkeeper. "These (wells) are not in the public interest for those of us that use and care for the Apalachicola River and Bay."

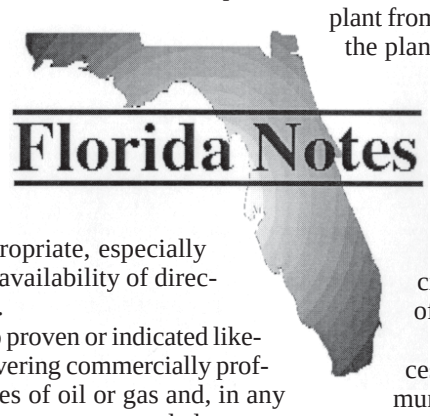
Earlier in October, DEP had issued a notice of intent to issue exploratory well permit #1393 to Spooner Petroleum for oil and gas drilling in northern Gulf County.

Spooner intends to drill approximately 2.6 miles northwest of Wetappo in unincorporated Gulf County. They propose to drill to approximately 12,900 feet.

This project was also opposed by many residents and environmental advocates who petitioned DEP to deny the permits in the ecologically sensitive region.

"The drilling pad would be located in a wetlands tributary to Wetappo Creek, a perennial stream tributary to East Bay, the eastern bay of St. Andrew Bay," said the Apalachicola Riverkeeper and Healthy-Gulf. "It would also be located entirely inside the 100-year flood plain of Wetappo Creek. During major flood events, the drilling pads would be surrounded by water flowing to Wetappo Creek, East Bay and St. Andrew Bay."

Spooner Petroleum is a royalty partner with Bear Creek Timber LLC, which is the owner of the underlying land at the proposed drilling site. Spooner also owns 12 square miles of wetlands and uplands around that site, noted the advocates.



This fact makes drilling in wetlands in the floodplain entirely inappropriate, especially in light of the availability of directional drilling.

There is no proven or indicated likelihood of recovering commercially profitable quantities of oil or gas and, in any event, the infrastructure needed to manage oil production would be extremely ill-suited to the wetlands of Gulf County, opponents said.

"The natural forests surrounding Panama City are a unique type to Florida," said Olivia Atkins of Pensacola-based Earth Ethics Inc. "They are known as sandhill prairies. These areas have various wildlife that are indigenous to the land and have now become either threatened or endangered because of the constant development."

McKay Bay WTE plant operations. The city of Tampa is taking over operation of the McKay Bay waste-to-energy plant from Wheelabrator who has operated the plant for roughly three decades. The city notified employees of the change in October.

The turnover is anticipated to be complete by mid-2020. Current employees are expected to retain their jobs.

The decision is financial. The city anticipates an annual savings of $5 million.

The McKay Bay plant processes in excess of 360,000 tons of municipal solid waste annually. The conversion of the waste to energy generates enough electrical power to supply up

NOTES
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SWFWMD adopts reduced flow rates for Homosassa, Chassahowitzka rivers

Staff report

In late October, the Southwest Florida Water Management District Governing Board adopted new minimum flow rates for the Homosassa and Chassahowitzka rivers. The new rates allow minimum flow reductions of eight percent for the Chassahowitzka and five percent for the Homosassa, replacing the three percent reduction established for both in 2015.

In terms of volumes, in 2015 the three percent reduction amounted to 4.86 cubic feet per second at Homosassa Springs. But under the new minimum flow standard, flow reductions could increase to 7.77 cubic feet per second, a five percent flow reduction.

With water conservation and reuse, the projected 2035 flows could be reduced by only 6.70 cubic feet—even if it were legally allowed to be reduced more.

For Chassahowitzka Springs, flow reduction due to groundwater withdrawals in 2015 was 2.85 cubic feet per second. By 2035, flow reduction will increase to 4.13 cubic feet per second, but could be only 3.48 cubic feet per second with conservation and reuse.

The new flow rates were approved at the board's October meeting. According to local news accounts, the meeting was heavily attended by residents opposed to the approved reductions, a decision that essentially allows more groundwater withdrawals that would lead to reduced flow.

One point of criticism was that only seven members of what should be a 13-member board made the decision.

Currently, six board positions are vacant.

THE WATER WATCH

New phosphorus removal facility. The Fleming Island Regional Wastewater Treatment Facility in Clay County broke ground on construction of a treatment train process to remove phosphorus from its effluent before reuse or sprayfield disposal.

Now under construction is a 40,000-square-foot media bed, a bioreactor with sand and organic matter.

According to officials with the Sustainable Water Investment Group, treated effluent will be pumped and distributed over a vegetated filtration bed that uses engineered media to remove phosphorus.

The media binds with phosphorous, removing it from the water. The phosphorus remains bound to the engineered media, so no byproduct is produced.

The project is a full-scale pilot demonstration. The St. Johns River Water Management District provided $1.5 million in funding, which the Florida Legislature appropriated in 2018 for the project.

The project's ultimate goal is to reduce phosphorus inflows to Doctors Lake. Over the past several years, the lake has experienced up to 10 algal blooms annually.

Ecosystem rights could protect natural resources. Across Florida, progressive advocacy groups are proposing county-wide and regional laws that recognize legally enforceable rights for designated ecosystems.

Grassroot efforts are underway in Brevard, Osceola, Orange, Alachua and Lee counties focused on the Indian River Lagoon, Santa Fe River, Wekiva River, Econlockhatchee River, Caloosahatchee River and Kissimmee River.

Rather than rely on legislators to carry the banner, these progressive groups are working through citizens' initiative processes or through county charter review commissions.

They are proposing "rights of nature" recognition and laws that promote a healthy environment and clean water as rights of local residents. If the referenda pass as envisioned, these new laws and policies would bar state preemption of local laws and natural resource protection policies.

These efforts are similar to the Lake Erie Bill of Rights passed in Toledo, OH, earlier this year. In Florida, the groups proposing new rules for each of the named ecosystems are coordinating their activities, but are otherwise operating separately.

Solar powered WWTP. In October, the city of Marianna's wastewater treatment plant began operation powered only by direct-current solar photovoltaic electricity generating systems.

The completed project included two photovoltaic arrays. A 1.9-megawatt solar array powers the 12-acre wastewater treatment plant and a smaller 400-kilowatt DC facility powers an eight-acre wastewater sprayfield.

In addition to the installation of 7,000 solar panels, the project included installation of five transformers and 35 inverters.

The two photovoltaic arrays combined will provide up to 2,300 kilowatts of electricity to operate the facilities.

Electricity accounts for about 23 percent of the wastewater utility's operations budget. Utility officials are hoping for annual savings of $325,000 through the use of photovoltaic arrays.

PCI Solar was the project's prime contractor. David H. Melvin Inc. provided the project engineering. Total project cost was $4.6 million.

The Florida Department of Environmental Protection provided a loan for the construction, with 80 percent of that forgivable and a 20-year repayment for the remaining 20 percent.

Deltona to audit water utility spending. Deltona city commissioners hired accounting firm KPMG to review their water utility operations including customer service and billing, water treatment and distribution, wastewater, financial planning and management, and human capital management.

The audit arose due to customer complaints about unexplained billing spikes, high rates and other controversial practices at Deltona's water utilities.

One resident spearheaded the formation of Deltona Strong, a public advocacy group that was joined by a sufficiently large number of Deltona residents to get the attention of staffers at State Representative David Santiago's office.

The representative's office then became involved when Santiago formed and led the Citizen Water Committee.

Deltona officials approved $191,437 for the audit due in December.

St. Lucie County water quality projects. Three new projects have been funded in St. Lucie County that will improve water quality in the St. Lucie River and Indian River Lagoon.

The Florida Department of Environmental Protection underwrote construction of a stormwater treatment area along Melville Road in White City to reduce nutrient inflows into the North Fork of the St. Lucie River.

A second project, the Richard E. Becker Preserve River Restoration, will restore an oxbow in the North Fork of the St. Lucie River by removing a plug blocking flow to the river's natural flood plain.

A stormwater buffer to reduce flooding and prevent muck accumulation downstream will also be constructed.

The project received $216,922 for permitting, design and construction. The Florida Department of Environmental Protection will fund the remaining $700,000 for construction.

WATCH

Continued on Page 5

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New solar-powered wastewater treatment system ready for prime time

By BLANCHE HARDY. PG

Daniel Yeh, PhD, PE, a professor in the University of South Florida's College of Engineering, and his research team have been working for five years to find a solution to global sanitation concerns.

The result of their work is a solar-powered wastewater treatment system that generates energy, nutrients and potable water.

Development of the NEWgenerator, an acronym for nutrient, energy and water, was undertaken in part through a $1.14 million Bill and Melinda Gates Foundation grant under the Gates' Reinvented Toilet program.

The Gates Foundation selected USF's NEWgenerator to be showcased at last year's Reinvented Toilet Expo in Beijing, China. Many technologies are showcased in the Reinvented Toilet program, but only a chosen few are selected to present at the annual exposition.

"In addition to partners who can help us scale the NEWgenerator for use in crowded, dense urban settings, we are also keen to connect with the humanitarian and emergency sectors," said lead investigator Yeh. "Some of the same challenges we see across the globe are found also in the U.S, especially after disasters. We would like to do something about that."

The NEWgenerator provides an alternative to pit latrines or septic tanks and can treat large quantities of wastewater to a high quality in a compact space, something neither latrines nor septic tanks can accomplish, Yeh explained.

"It eliminates the need for building sewers and large centralized wastewater treatment plants, which are exorbitantly expensive and disruptive in most places," he said. "A big customer pain point in developing countries is the high cost of frequent desludging from pit latrines.

WASTEWATER
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WATCH

From Page 4

Elsewhere, the Comprehensive Everglades Restoration Plan funded the Teague Hammock Hydrologic Restoration Project to restore and help preserve a 300-acre wetland for storage and water quality improvement of agricultural runoff before it enters the St. Lucie River.

Teague Hammock was purchased for preservation with Florida Forever funds. The restoration efforts will be funded with $600,000.

The total cost of these three projects is $2.3 million.

Two ag projects receive major grants. Marineland Aquaponics in Putnam County and C.P. Wesley Smith in St. Johns County will each receive $222,734 from the St. Johns River Water Management District for projects to benefit water supply and quality in the St. Johns River.

Marineland Aquaponics will use its grant to fund the second phase of a closed circulation aquaponics system at its facility. C.P. Wesley Smith will use its funding to install additional sub-irrigation drain tiles. The tiles will replace a traditional seepage irrigation system.

Both projects are intended to conserve water and reduce nutrient leaching to surface waters. In the case of Wesley Smith operations, earlier sub-irrigation drain tile conversions decreased irrigation water consumption by 51 percent. Total nitrogen and total phosphorus loads decreased by 30 percent and 43 percent, respectively.

Total nitrogen load reduction for the two projects combined is expected to be 32,642 pounds per year. Phosphorus is expected to decline by 4,671 pounds per year. Water use by the two farms is expected to fall by 1.41 million gallons.

The Florida Department of Environmental Protection funds the program and the district administers the grants, including recipient selection.

More funding for conservation projects. The SJRWMD Governing Board also approved 13 agricultural projects to receive cost-share funding to improve water conservation and nutrient reduction.

The funding supports fertilizer application conversion, tailwater recovery and reuse, GPS-controlled land-forming technology, installation of polypropylene groundcover and weather stations, and other irrigation improvements that increase the efficient use of water.

Five Lake County applicants received funding, the most of any county in the district. Indian River County applicants followed closely with four successful applicants. Two applicants in Marion County were funded. One each in Brevard and Orange counties rounded out the tally of funded applicants.

The projects will share $1.56 million.

In approving the grants, SJRWMD estimated that the funding would conserve 2.37 million gallons of water per day, reduce total nitrogen releases by 38,222 pounds per year and total phosphorus releases by 5,483 pounds per year.

The agricultural cost-share program began in 2015 and is now beginning its fifth year. Over that time, it has supported 85 partnership projects.

This year, the district received 22 applications in 15 counties. The projects were competitively evaluated and ranked, and the top 13 approved for funding.

Lake Apopka North Shore project begins. In October, the SJRWMD Governing Board awarded Intercounty Construction Inc. a contract to build a pump station in support of the district's Lake Apopka North Shore project.

The pumping station is part of a larger infrastructure project to raise the levees along the north shore of the lake. The impoundment created will hold more water for treatment, particularly after major rain events.

The new pump station will allow water managers to move water to the higher levels created by the rebuilt levees.

The district expects the new treatment process to remove the 143 pounds of phosphorus per year from Lake Apopka.

Paynes Prairie flood protection. During the past several years, stormwater from Paynes Prairie has flooded U.S. Highway 441. During the past several months, a control structure with two gated culverts that diverts water from Newnan's Lake and Prairie Creek to Camp Canal has been rebuilt.

If high rainfall is expected or occurs, closing the gates will divert water to Camp Canal along the east side of Paynes Prairie and eventually to Lake Orange.

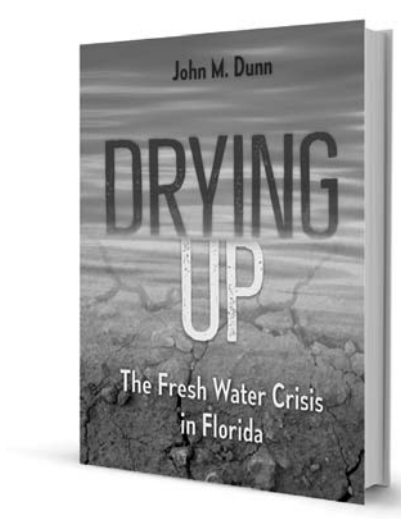
In September, the system was tested when Hurricane Dorian dropped significant rainfall in the watershed. The culverts were closed to divert water and no flooding occurred on U.S. 441.

The improvements were jointly funded by DEP and the St. Johns River Water Management District, which provided $500,000 and $288,000, respectively, to cover the total cost of $788,000.

Bonita Springs Utility recognized. Bonita Springs Utility received the Florida Water and Pollution Control Operators Association Utility of the Year Award for its outstanding safety record.

The award acknowledges the safety record for Bonita Springs Utilities collection system, distribution system, water treatment plant, and East and West Water Reclamation facilities.

The utility serves the city of Bonita Springs, the village of Estero and areas in unincorporated southern Lee County.



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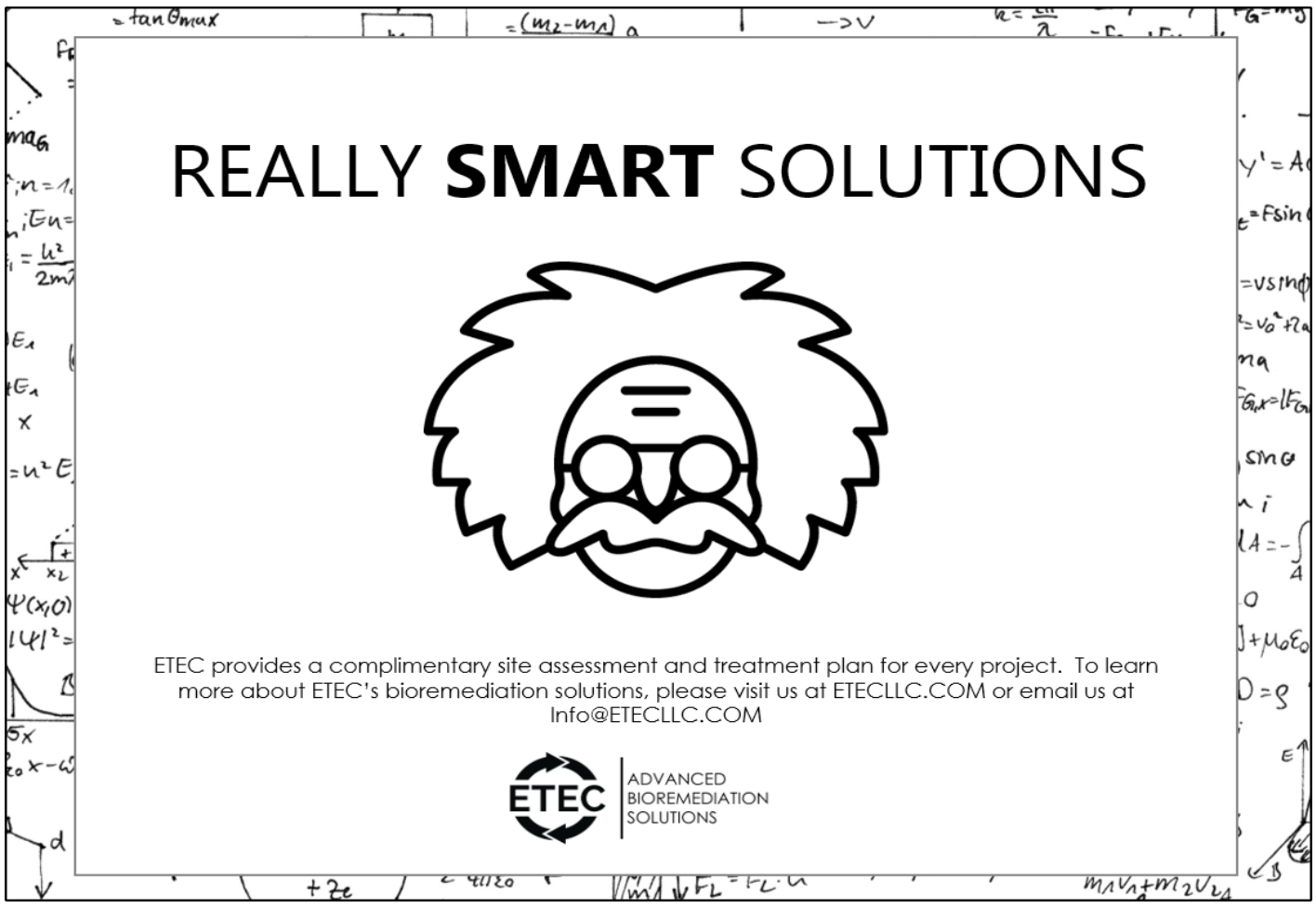

Microbubble harvesting a potent tool for managing harmful algae blooms

By ROY LAUGHLIN

A team of AECOM engineers and scientists think they have an effective, affordable technology to harvest cyanobacteria, particularly *Microcystis*, when cyanobacteria bloom in Lake Okeechobee or elsewhere.

They use microbubbles to sequester cyanobacteria cells in a surface floc that is easily skimmed from the water.

The use of microbubbles to clarify wastewater in treatment plants is well-established. AECOM engineers developed a modestly sized mobile demonstration system and have been touring the state and, more recently, around the U.S.

AECOM posted a video online that shows microbubble flotation of microalgae from a glass flask. Within seconds of microbubble generation, a microalgae floc covers the surface of the water in the flask.

As the bubbles rise to the surface, the water in the flask is seen to be virtually colorless and clear. It is a convincing demonstration that any evangelist would appreciate.

This summer, AECOM engineers demonstrated the system near one of Lake Okeechobee's outflow structures in Moore Haven.

Although a thick algal bloom was not in progress at the time, the demonstration was a success.

Dan Levy, vice president of the firm's environmental business line in the Americas, explained the concept as attacking nutrients at their source by using mobile harvesters on land or boats. And when needed, the harvesters can be used to respond to blooms when and where they episodically occur.

AECOM's July demonstration in Lake Okeechobee was the culmination of a year of collaborative research between AECOM, the U.S. Army Corp. of Engineers and the U.S. Army Engineering Research Design Center's HABITATS program.

The demonstration was the first step in what AECOM engineers and scientists hope will lead to the construction of 10-million-gallon-per-day filtration plants adjacent to Lake Okeechobee's four major tributaries.

Water will be treated to remove *Microcystis*, other cyanobacteria and the nutrients they have bioaccumulated. This could make a major contribution toward eliminating cyanobacteria blooms before they start.

The immediate need driving the development of HAB exclusion or removal from water releases from Lake Okeechobee is to prevent human, animal and wildlife exposure to their toxins.

AECOM's capability to remove the entire cell, its toxins and bioassimilated nutrients taken up from the eutrophic waters provides multiple benefits.

For the Lake Okeechobee treatment demonstration, AECOM added an ozone generator to oxidize microcystin, the cyanobacteria's toxin, in water after harvesting *Microcystis* cells.

Typically, cells are three to five percent phosphate and perhaps two to three times that in organic nitrogen. "Luxury consumption" of nutrients under eutrophic conditions makes some bacteria cells microsponges that sop up nutrients.

Harvesting cyanobacteria cells by microbubble flotation is potentially capable of removing substantial masses of phosphate and organic nitrogen.

Levy said his colleagues made a few simplifying assumptions about phosphorus inflow into Lake Okeechobee via its four major tributaries, primarily using South Florida Water Management District water quality and flow data from 2017.

Based on four 10-million-gallon-per-day treatment plants servicing each of Lake Okeechobee's major tributaries, the treatment facilities could collectively remove 115 tons of phosphorus per year. This would be about a quarter of the 468 tons of phosphorus that the four tributaries contribute to Lake Okeechobee.

If a treatment plant was placed only on Taylor Creek-Nubbin Slough and treated 10 million gallons annually, 54 tons of phosphorus would be removed according to researchers' calculations, Levy noted.

AECOM's R&D staff have put a lot of thought into how to dispose of what could be hundreds of thousands of pounds of dried biomass that would be similar to a low-concentration fertilizer.

Levy said they have gone beyond hypothetical scenarios. AECOM has a working agreement with Algix LLC of Meridian, MS. Their Bloom line includes a commercial process to make polymer foams from algal products. The company uses the algal foams to make shoes. This process is actively commercialized.

In addition, harvested algae may be converted to biofuel, another commercially active technology.

To enhance the mobility of their cyanobacteria harvester, AECOM engineers developed the concept of floating a harvester on a barge pulled by boats trailing booms shunting cyanobacteria to the algal harvester intake.

They proposed that such a harvester could essentially eliminate cyanobacteria blooms in Lake Okeechobee's offshore areas. That could stop a developing bloom from becoming a crisis.

AECOM's project and its demonstrated capability is an interesting contrast. The basic mechanism has been in use for the better part of a century. But its use to sequester cyanobacteria and bioassimilated nutrients is novel.

The engineering exercise to design both fixed facilities and mobile platforms is an extension of the technology that so far has largely been developed for closed systems in industry, or semi-closed stages of wastewater treatment.

The mobile microbubble harvesters have prospects to become widely used for harmful algal bloom prevention and control in surface waters.

DEP seeks bloom solutions

The Florida Department of Environmental Protection is another possible end-user of AECOM's harvester technology.

DEP' potential involvement is outlined in Gov. Ron DeSantis' Executive Order 12-19. In it, he authorized the establishment of the Blue-Green Algae Task Force.

The task force is charged with identifying projects for funding based on scientific data and implementing nutrient reduction in key state water bodies, as well as making recommendations for regulatory changes.

DEP released two RFIs to identify additional nutrient reduction projects within the Lake Okeechobee basin.

RFIs for projects for the Caloosahatchee and St. Lucie BMAP rivers are expected to be issued.

While there is no funding available now for projects submitted in response to these RFIs, projects listed in the updated BMAPs will be targeted for future funding.

If DEP becomes involved in harmful algal bloom control, the amount of funding available for cyanobacteria management could potentially be substantial and persistent.

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EWG releases latest data on quality of America's drinking water

By BLANCHE HARDY, PG

The Environmental Working Group released its 2019 Tap Water Database of compiled water utility data throughout the country. The database has been published annually since 2005.

The current report, on-line at the EWG website, is searchable by zip code. It includes data collected in 2016 and 2017.

"Since 2012, water utility testing has found pollutants in Americans' tap water, according to an EWG drinking water quality analysis of 32 million state water records," the report noted.

EWG said that although water providers may be compliant with current water quality standards, many of the standards are decades old and may be outdated. And standards for some contaminants found today in the public water supply may not exist at all.

"The federal drinking water standards have not been updated in decades and the regulatory process does not take into consideration the heightened vulnerability to toxic chemicals on children, infants and the developing fetus," said the report.

Many chemical contaminants known to pose risks lack enforceable federal health standards, leaving the public susceptible to harm from tap water, the report noted.

The report included data on 1,617 Florida utilities serving 19,730,000 customers. EWG found 96 contaminants in the records compiled in Florida.

During the reporting period from April, 2012, through March, 2017, 30 large Florida utilities accumulated or accrued the most violation points.

Of these, the R.C. Willis Water Treatment Plant in Palatka serving 11,900 people had the largest number of violations with 67 for 12 total contaminants. Two contaminants, radium and total trihalomethanes, exceeded EWG health guidelines.

Among the largest Florida utilities listed as having exceeded standards are Palm Beach County Utilities with 529,876 people served and 13 violation points, the city of Cocoa with 285,352 people served and 14 violation points, and the city of Fort Lauderdale with 182,145 people served and six violation points.

Other EWG-listed Florida utilities with violations serving approximately 100,000 people include the TOHO Water Authority, Martin County Utilities, Clearwater Water Systems, and North Miami Beach.

Thirty smaller Florida utilities accumulated or accrued the most violation points in the reporting period from April, 2016, through March, 2019.

Of these, River Grove Mobile Home Village serving 432 residents had the largest number of violations with 88 for eight total contaminants.

EWG developed their own "no compromise" safety standards using current independent scientific evidence, legal standards and health advisories, including creating standards for contaminates with no federal limit or limits considered by EWG to be too weak to ensure safety.

For example, the federal standard for barium is two parts per million, while the EWG recommended standard is 0.7 ppm due to evidence that barium exposure may result in high blood pressure and harm to the kidneys, heart and blood vessels.

More dramatically, the federal standard for trihalomethanes is 80 parts per billion, but the EWG recommended standard is 0.15 ppb due to evidence that trihalomethane exposure may result in bladder and skin cancer, and harm to fetal growth and development.

"We want you to know the whole story about what's in your tap water," said EWG President and Co-founder Ken Cook. "Our tap water database has information from nearly 50,000 local utilities in every state. The information includes about everything their test found in your community's drinking water. We don't just tell you what they found, we tell you what it means—how the chemicals in your tap water can harm your health."

The EWG database also includes a guide to help users pick a water filter that is right for their drinking water.

Energy efficiency jobs abundant nationwide, still on the upswing

By ROY LAUGHLIN

The energy efficiency sector provides a significant source of employment, both nationally and in Florida. Employment in this sector increased nationwide to 2,324,865 in 2017, the most recent year for which statistics are available.

Energy efficiency job growth of 76,000 jobs led the broader energy sector that weighed in at total job growth of 151,700.

In 41 states, energy efficiency jobs provide more work than the entire U.S. fossil fuel industry. And nationwide, twice as many jobs are in energy efficiency than in the fossil fuel industry.

The construction industry employs 1.29 million workers, 56 percent of all workers in the energy efficiency category nationwide.

In 2017, Florida maintained its fourth-place ranking with 118,412 jobs. Only California, Texas and New York, ranked first through third, respectively, produced more energy efficiency jobs.

The energy efficiency workforce includes a variety of industries and disciplines that make energy use more efficient. They include Energy Star appliance manufacture; light emitting diode, compact florescent lighting and other efficient lighting systems; both traditional and high-efficiency heating and cooling; advanced materials and installation; recycled building materials; water efficiency products; and a general category dubbed "others."

The term "energy efficiency" as used here applies to industries as well as positions within industries, according to one of the report's caveats. In other words, an architectural firm may have a section that focuses on energy efficient design and construction, even if the firm's primary activity is not energy efficiency design alone.

Nationwide, 28 percent of energy workers are involved in energy efficiency jobs. The nation's top 25 metro areas employ over 900,000 energy efficiency workers. Even with that urban workforce concentration, nearly all counties in the country have workers employed in energy efficiency jobs of one kind or another.

Florida's energy efficiency jobs spectrum by industry varies a little from that nationwide: 41,381 of Florida's energy efficiency jobs are in HVAC.

Energy Star appliances and efficient lighting rank second with 32,499 jobs. Closely following in third place is building materials and insulation with 31,455 energy efficiency workers.

The "others" category adds another 13,077 positions.

The report also recasts employment data by supply chain category. By this classification, Florida's largest category is construction and repairs. It accounts for more than three quarters of all of Florida's energy efficiency jobs at 118,412.

This proportion, which mirror's the construction industry's dominance in Florida, is far greater than the construction category's national ranking. Florida's second category by numbers of jobs, professional services, has just 1,302 jobs.

According to the report, Florida's small businesses dominate the energy efficiency sector. Those with one to five employees comprise 40 percent of all energy efficiency businesses. An additional 35 percent are in businesses with six to 19 employees.

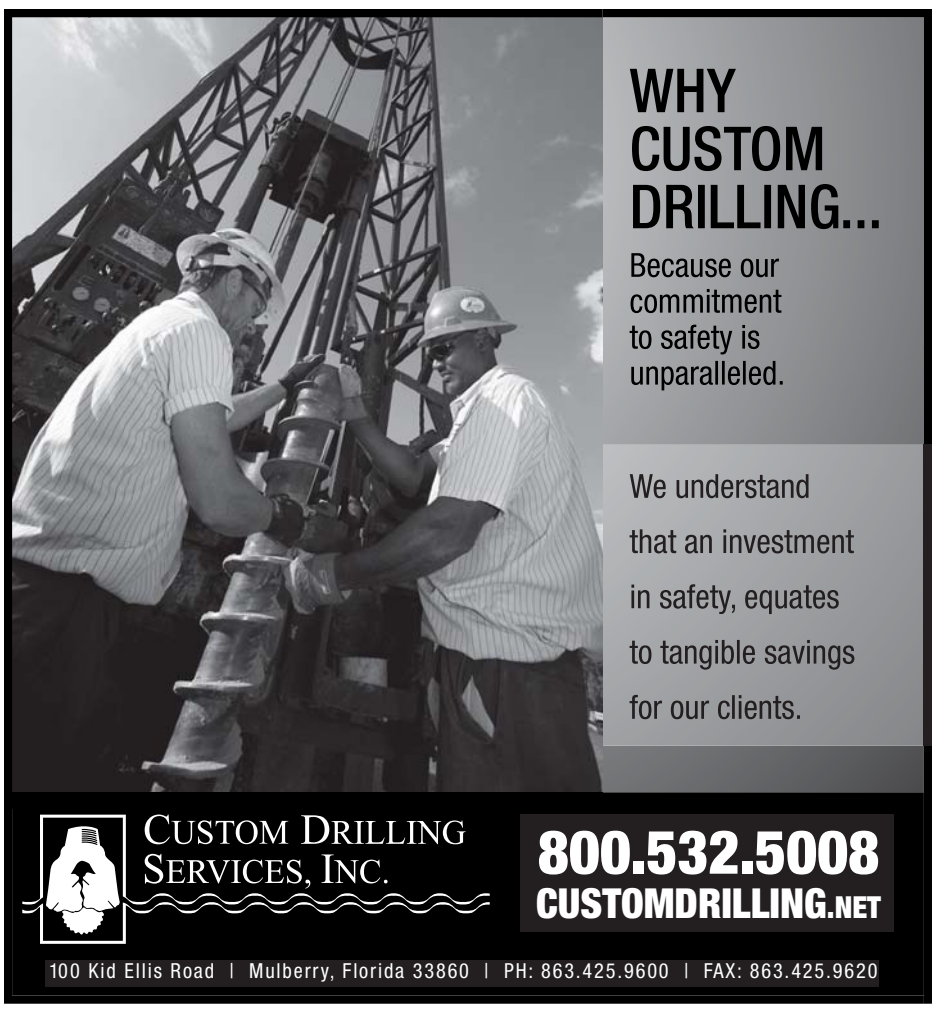
Businesses with more than 100 employees comprise a meager five percent of Florida's energy efficiency workforce. More than three quarters of Florida's counties have between six and 10 workers per 1,000 workers employed in the energy efficiency fields.

The growth rate of Florida's energy efficiency jobs accelerated in the most recent two years of reported data. In 2016, employment growth rate was 3.6 percent. In 2017, it grew markedly to 5.1 percent.

Florida's broader statewide growth rates were 3.7 percent and five percent in 2016 and 2017, respectively, according to the Florida's Office of Economic and Demographic Research.

More than three quarters of Florida's counties have between six and 10 workers per 1,000 workers employed in the energy efficiency fields.

The information presented here comes from the 2019 Energy Efficiency Jobs in America report, an annual summary of employment in the energy efficiency sector prepared by E2 and E4theFuture. The data comes primarily from the 2017 U.S. Energy and Employment Report.



Innovative treatment technology addresses problematic petroleum contamination

By GORDON DEAN, PE

A multi-use convenience store site located in Panama City Beach, FL, was impacted by contamination from a leaking underground storage tank.

The site formerly dispensed gasoline and had three 6,000-gallon USTs in use from 1988 to 2007.

During an annual storage tank site inspection in 2007, the middle tank, UST-2, failed a tightness test and exhibited product loss.

A further report determined that 1,000 gallons of fuel had discharged from the tank, which was then taken out of service. Further assessment determined that free product was present on the water table.

Following this conclusion, soils were excavated during tank removal and a bioremediation system was installed and operated from 2012 to 2015 by a previous consultant.

During the first quarter of 2015, the bioremediation system was removed and post-active remediation monitoring of groundwater began.

Advanced Environmental Technologies LLC became the consultant of record for the site in September, 2015, under a performance-based cleanup contract. AET prepared a remedial action plan modification to address the residual groundwater contamination.

The RAP modification called for injection of hydrogen peroxide and nutrients into both existing wells and direct push drilling technology injection points. The injections took place from Feb. 29, 2016, through Mar. 4, 2016. Post-injection sample results collected 30 days after injection were below cleanup target levels. However, concentrations rebounded to pre-injection levels.

Post-application remedial monitoring sampling has been conducted quarterly since then. As of Quarter 6 in October, 2017, the groundwater concentrations remained above cleanup target levels.

Monitoring Well 8 was particularly concerning because it is offsite, downgradient of the source area, and contained the highest contaminant concentrations associated with the site.

Interested in a more effective solution, AET sought a technology that was affordable and would be guaranteed to lower the contaminant levels below the target levels. To achieve this, AET partnered with Regenesis to conduct a pilot test using Regenesis' new PetroFix liquid activated carbon technology. The pilot test was the first field application of PetroFix.

PetroFix Remediation Fluid is a concentrated, water-based, activated carbon suspension specifically designed to remediate petroleum spills and provide immediate results for gas station and UST sites.

It is designed to first remove hydrocarbons from the dissolved phase by adsorbing them onto activated carbon particles, and then stimulating hydrocarbon biodegradation by adding electron acceptors.

This technology is paired with the PetroFix Design Assistant, an online design tool that enables users to individually tailor their site designs and self-apply PetroFix.

AET chose this technology because it offered a cost-effective solution that would quickly address the groundwater concentrations.

The PetroFix pilot test injection was applied at MW-8, which had the highest contamination levels. This well is located in a vacant lot across the street from the convenience store.

Prior to the injection, baseline sampling was conducted at MW-8 and downgradient well MW-16 for BTEX, PAHs and TRPH.

Because this was a pilot test using a new technology, samples were analyzed for additional parameters such as microbial counts, alkalinity, total organic carbon and chemical oxygen demand.

Over the course of three days, 1,700 pounds of PetroFix and electron acceptor salts were injected into 13 points around MW-8.

The injections were completed using direct push technology and started at 20 feet below ground surface and stopped at 10 feet bgs.

The direct push rod was driven to the terminus depth of 20 feet and a pump was used to inject the chemical through the drill rod as the rod was lifted in two-foot increments.

The injections were completed at pressures of approximately 10 to 50 pounds per square inch due to the site's fine, compacted sands, and even distribution as verified through soil cores.

After injection, the boreholes were filled with cement grout to land surface. Active groundwater monitoring was conducted quarterly following the pilot test.

Just 60 days after injection, the petroleum contaminants were below detection levels. After five quarters of monitoring, no exceedances of any petroleum groundwater cleanup target levels have been observed in MW-8.

Of further interest was documenting that hydrocarbon-degrading bacteria were thriving at the site, which is evidence that hydrocarbons were being biodegraded from the PetroFix.

QuantArray Petro analysis by Microbial Insights verified that microbes associated with petroleum hydrocarbon degradation maintained robust populations following application, including total bacteria, sulfate degraders and PM-1, which degrades MTBE and other hydrocarbons.

In September, 2018, Regenesis applied for an innovative technology acceptance letter from the Florida Department of Environmental Protection. The innovative technology letter was issued on May 14, 2019.

AET has since designed a full-scale application of PetroFix and received DEP final approval in late October. The injections are scheduled for Jan. 6 - 10.

Gordon Dean, PE, is vice president of Advanced Environmental Technologies LLC in Tallahassee. He can be reached at gdean @aetllc.com.

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Native American tribes question Lake O watershed restoration work

By BLANCHE HARDY, PG

The U.S. Army Corps of Engineers and South Florida Water Management District are proposing to flood in excess of 13,600 acres, creating 46,000 acre-feet of surface water storage as part of the Lake Okeechobee Watershed Restoration Project.

The surface water storage project, the K-05 Wetland Attenuation Feature, is on the northern side of the lake east of Seminole tribal trust and tribal-owned lands and west of combined Canals C-41A and L-62.

Native American representatives oppose the project element that is adjacent to the Seminole Brighton Reservation.

Paul Backhouse, PhD, senior director of the Heritage and Environmental Resources Office for the Seminole Tribe of Florida, provided comments on behalf of the tribe at an October South Florida Ecosystem Restoration Task Force meeting.

Backhouse said the tribe finds the wetland attenuation portion of the restoration plan "particularly concerning."

While the Seminole support wetland restoration in general, they do not support this specific plan due to the significant number of tribal cultural and historic sites on the eastern portion of their land that could be flooded with any breach of the attenuation area boundary.

The tribe also have future development plans for their land that could similarly be threatened by a breach in the wetland attenuation area boundary.

In addition to potential impacts due to proximity to the wetland attenuation feature, there are tribal sites within the attenuation feature boundaries. Flooding the attenuation area could put burial sites under water.

Backhouse compared submerging Seminole ancestral remains to "consigning them to a form of hell."

"My biggest concern with this plan is that it doesn't address all of the different

FLOOD
Continued on Page 14

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Duke Power files assessment of corrective action for Crystal River power plant contamination

By ROY LAUGHLIN

This summer, Duke Power Corp. filed a Coal Combustion Residuals rule Assessment of Corrective Measures Report describing findings of excess levels arsenic, lithium and molybdenum in groundwater at its Crystal River Energy Center, or CREC, in Citrus County.

Following passage of the CCR rule, Duke initiated required monitoring around its coal ash handling and impoundment areas at the plant.

Monitoring showed fugitive contaminants in groundwater that had leached from the facility's ash storage and disposal area, or AS/DA.

Arsenic exceeding the groundwater protection standard occurred in samples from a majority of the CREC wells. More than half of the wells around the perimeter and downgradient of the AS/DA had arsenic concentrations above acceptable levels.

From 2018 to the spring of 2019, arsenic levels ranged from well below the 10 micrograms per liter arsenic standard to as high as 79.8 micrograms per liter, according to the annual monitoring report required by the CCR.

A small number of monitoring wells along the facility's northern boundary had high arsenic levels attributable to an adjacent U.S. Gypsum facility. That off-property-source arsenic is not subject to the current remediation plan.

Also notable was that high arsenic levels were not found in groundwater on area wells downgradient and near the Gulf of Mexico. Contamination, at least arsenic contamination, is localized only around the AS/DAs.

Lithium concentrations were also occasionally high with one result as high as 502 micrograms per liter. Molybdenum's highest concentration was 328 micrograms per liter.

Water quality standards for those metals are 40 and 100 micrograms per gram, respectively.

Duke began installing monitoring wells in 2015 and has now installed an array of 26 wells.

Some additional monitoring wells may be required to provide the desired data to guide corrective actions for lithium and molybdenum.

The data, obtained and reported by Geosyntec Consultants Inc., is presented in the CREC's required 2018 and 2019 CCR annual reports covering four quarterly sampling intervals in 2018 in early 2019.

The clock is ticking down to the start of arsenic, lithium and molybdenum-contaminated groundwater cleanup at the Crystal River Energy Center in Citrus County.

The good news for Duke is that monitoring well arsenic concentrations, especially evident for wells that initially had high arsenic concentrations, are largely stable.

In addition, a couple of the high-level wells are exhibiting slight downward trends in arsenic concentrations.

Arsenic-contaminated groundwater is confined to Duke's property. Sampling wells yielding arsenic above the 10 micrograms per liter limit are adjacent to the approximately 100-acre AS/DA on the 4,730-acre property.

Of that total, only 1,462 acres are developed for power plant and transmission facilities. No public potable water wells are near or downgradient of the coal ash impoundment.

Monitoring wells near the Gulf of Mexico, downgradient from the AS/DA, yielded no water samples with excess coal ash contaminants.

Duke Power's Assessment of Corrective Measures Report, submitted this summer, is a significant milestone for remediation efforts at the Crystal River Energy Center. It starts the clock on a required remediation effort.

In its report, Geosyntec noted that if Duke decides to close the AS/DA as a control measure, the company would have to install a final cover system over the ash pits.

It could choose to excavate the ash for beneficial use or it could excavate and store ash off-site, a strategy used elsewhere in Florida to decommission coal-burning power plants.

A hybrid option presented in the report is to beneficially reuse as much of the ash as possible and store the remainder on-site in a smaller landfill. The smaller landfill would require construction.

Ditches and stormwater ponds on the site will also require removal of coal combustion residuals and sediments contaminated by it.

When excavated, it would be subject to the same remediation treatment as the AS/DA.

"These source control measures (described above from the report) will substantially reduce the introduction of additional constituent of interest mass into groundwater from the AS/DA," the report noted.

In response to a query, Paige Sheehan, APR, director of regional communications at Duke Energy, said that in recent years, Duke has found a substantial beneficial reuse market for ash from the CREC coal plant.

"The net amount of ash sold directly from the generating station and reclaimed from the ash landfill for beneficial reuse was higher than the amount generated during the year," she said.

She explained that Duke works through coal ash marketing companies to provide ash for Portland cement and ready-mix concrete.

"We've recycled more than we produce for many years, with the possible exception of 2016," she said. "We're likely to continue the process for at least another decade.

"Bottom line is that we look for recycling opportunities that turn this waste into a valuable product and benefit our customers. Also, safe recycling is the only way to avoid permanent disposal. We're pretty proud of this work."

Cleaning up groundwater will also be required. The report provided a list of candidate remediation technologies.

In-situ methods include migration barriers, chemical immobilization and permeable reactive barriers.

Groundwater extraction, through either conventional vertical well systems or phytoremediation, is a second category of candidate cleanup methods.

Other groundwater treatments and monitored natural attenuation are also listed as candidate remediation methods.

By submitting its CCR Assessment of Corrective Measures Report, Duke is committed to site remediation but has an unspecified time frame for selecting the best method or methods.

Duke and its consultants will continue monitoring to provide additional assessment that will guide remediation planning for molybdenum and lithium contamination on certain parts of the site.

After selecting a remediation method, Duke must by law hold a public meeting within 30 days to characterize what the company plans to do.

"Duke has been working with the Florida Department of Environmental Protection regarding groundwater issues and corrective action," Sheehan said. "When Duke has corrective action options more fully fleshed out, we'll continue discussions with the regulators and the public."

She noted that the CCR rule does not specify a specific date to select a remediation plan but that Duke is now working to further explore the feasibility of the various options as quickly as possible.

The clock is ticking down to the start of coal ash and groundwater remediation at Crystal River, and reuse may be a significant component of the eventual fate of the ash.

EPA moves to censor public health data used to drive environmental regulatory process

By ROY LAUGHLIN

In late October, the U.S. Environmental Protection Agency announced amended rulemaking that modified its originally proposed April 2018 rule, Strengthening Transparency in Regulatory Science.

When Trump administration officials start endorsing transparency in government, "miracle cure" is the first thought that springs to the minds of the eternally hopeful. It would be one in the genre of St. Paul's conversion on the road to Damascus.

Most of the EPA's plans invoke murky jargon rather than clarity. It proposed contorted EPA definitions for "reanalyze," "independent validation," "data" and "models," and clarified that the proposed rule applies to all data and models underlying "pivotal sciences" used to support decision-making. If you've read this far because you still expect that miracle, add speaking in tongues.

"The era of secret science at EPA is coming to an end," said Scott Pruitt in 2018 to announce the beginning of the rulemaking under discussion. Pruitt protested secrecy too much in this statement. It is a struggle for the imagination to keep the Trump EPA's fictional narrative on track. Sinister scientists are villains in this drama of alleged occult data and indecipherable data analysis.

The EPA narrative's fatal flaw is that their "bad data" don't have withheld secrets. In fact, they have very real but anonymous subjects. Human subject studies in the U.S. and Europe collect certain categories of data under laws and rules that provide "human subject protection."

Since the 1970s, U.S. human health data has been gathered under informed consent guidelines that include privacy protection. A summary of those rules is publicly available in the document, The Regulatory Framework for Protecting Humans in Research - Intentional Human Dosing Studies for EPA Regulatory Purposes.

These rules are far from the "secret" that EPA political appointees claim. And it's downright unbelievable that today's EPA leaders do not understand how these protections work or even why they are necessary.

What is not sufficiently appreciated is how important public health studies are to essential human health and safety regulations under the Clean Air Act, the Clean Water Act and almost every other EPA public health rule whose justification and form depended on data from human subjects.

Scientists and the institutions that employ them are bound to follow the law and ethics rules that protect research subjects. EPA recklessly proposes to abandon science because the identity of subjects is to remain confidential, as required by law. When agency stooges trash such data and the objective analysis of it, society as a whole loses the protections afforded by public health rules.

The EPA intends to further restrict science's rightful place in public health policy by legitimizing administrative fiat to choose data and models that underlie their desired outcomes.

To illustrate how "transparent" this will make EPA, consider the agency's press release that critiqued *NY Times* reporter Lisa Friedman's reporting of EPA's amended rulemaking.

The following quote is from an EPA press release dated Nov 11, 2019:

"The reporter (Lisa Friedman) incorrectly states that: 'The politically appointed agency administrator would have wide-ranging discretion over which studies to accept or reject.' This is completely false. The rule requires transparency but gives the EPA administrator the discretion to use studies when information is not available. However, this should be the exception instead of the way of EPA doing business."

There is a huge difference between "discretion to use studies" and "sole authority for making decisions about alternate approaches to the public availability provisions of data and models that underlie decisions."

If the EPA wants to start with transparency, its defenders should stop making up, using and abusing jargon and reference the language in the rule. "Sole discretion" has only one obvious interpretation and that doesn't involve exceptions. Neither is it conditioned on the absence of data. The transparent explanation is that, whether with or without data, the EPA is giving its administrator a pass to base decisions on influence.

Abandoning its censored data and substituting its sole discretion, the rule that EPA will likely neuter first is the Clean Air Act during its periodic review of specific air contaminants that affect human health. A 1993 Harvard study of air quality and human health is the foundation of the CAA.

Alabama Republican Senator Richard Shelby, in a shameful public coddling of coal mining and the coal-powered electricity and steel industries, has attacked the Harvard study. Its authors, following privacy stipulations in the subjects' informed consent agreement, would not release the data to the public. In this case, the "public" was the industries and their lobbyists.

In the late 1990s, the Harvard study's data was reviewed and reanalyzed by qualified third-party professionals in compliance with confidentiality rules. That third-party reanalysis strengthened the conclusions offered in the original study.

Since then, granting agencies and researchers have developed protocols to generally allow independent data reanalysis or aggregation while preserving human subjects' privacy. What will it take for EPA Administrator Andrew Wheeler to understand that basic fact?

If scientific data are unreasonably put beyond the EPA's consideration, the public should not expect scientist action heroes to immediately fly to the rescue of public health. It is no secret that the agency has purged itself of expert advisory committee scientists just because they had received EPA research funding.

Now, EPA advisory committees are dominated by non-scientists and hand-picked industry-connected forensic researchers. The advice the EPA now receives from its advisory committee members has no guarantee of scientific quality, rather, it is now excessively at risk of being opinion heavily biased by self-interests.

In its response to Lisa Friedman's article, the EPA press release stated that "non-government funded research should also be subject to transparency requirements." It would be a miracle if "should" asserted in a press release had any more substance than a whim. Unfortunately, specifics that make transparency guarantees in the proposed rule to censor *industry* data are not evident. Maybe it's a secret plan to be revealed later.

It is a fact, not a whim, that businesses under EPA product and chemical regulation can declare their data to be "confidential business information" and further obscure it from public reach and review. The EPA proposal baldly extends an already grossly unfair asymmetrical benefit to business, commerce and industry in its regulations.

How the EPA's proposed rule changes will protect public health is impenetrably murky. However, their intention to continue to expand favor to businesses and the regulated is crystal clear in this rule and its recent amendments.

Apostle Paul, on the way to Damascus, survived the fall from his horse, which many early believers considered a miracle. But the EPA's amended rule proposal is no miracle cure for the "secret data plague" that terrified Scott Pruitt and continues to terrify Andrew Wheeler without reason or evidence.

Under the Trump administration's EPA, the American public will need miracles to prevent the pernicious erosion of human health and safety benefits that our science-derived laws and rules now provide. And that is no secret to anyone paying attention.

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The *Florida Specifier* welcomes columns, articles and letters to the editor on any subject or issue pertinent to the environmental, regulatory and technical areas the newspaper covers. We reserve the right to edit all submissions for newspaper style and publish submissions on a space-available basis only. The opinions expressed on this page are those of the authors.

Florida's imperiled springs destined for doom

By ROBERT KNIGHT, PHD

The Florida Legislature had ample warning that their 2016 Florida Springs and Aquifer Protection Act was inadequate to fix the nitrate pollution nightmare in Florida's springs. The Florida Springs Council warned legislators that the law as written did not have the teeth needed to solve a problem 50 years in the making.

As required by FSAPA, the Florida Department of Environmental Protection determined that 24 of 30 Outstanding Florida Springs are currently impaired by excessive nitrate pollution.

The department also estimated that nitrate loads discharging from these 24 impaired Outstanding Florida Springs needed to be reduced by 68 percent to meet water quality targets.

This nitrate reduction goal will require the elimination of approximately 63 million pounds of nitrogen loading to the land surface in the associated springsheds. The FSAPA directed DEP to develop basin management action plans to achieve this goal, resulting in 13 BMAPs that were adopted by DEP in 2018 to provide a 20-year roadmap to restore these springs.

Prior to 2016, DEP scientists had already documented that reliance on BMAPs to reduce groundwater and springs nitrate pollution was unsuccessful. After implementation of upgraded agricultural best management practices to achieve the 2012 Santa Fe BMAP, nitrate concentrations are still increasing in the Santa Fe basin groundwater and springs.

Albert Einstein is famously quoted as saying that the definition of insanity is doing something over and over and expecting a different result. Unfortunately, Florida's top legislators trusted lobbyists to write the 2016 Florida Springs and Aquifer Protection Act rather than accepting the evidence provided by their own springs technical experts that current springs BMAPs are not effective.

The Suwannee River and its 250+ artesian springs were designated Outstanding Florida Waters in 1979. This legally binding status allows "no degradation of water quality."

Since that time, nitrate discharging from those springs has increased by 50 percent. The sources of this nitrate pollution are an estimated 36 million pounds of nitrogen per year, primarily from farm fertilizer and livestock operations.

The 2018 BMAP for the springs along the Suwannee does not have any requirement for reduced nitrogen fertilizer application or reduction in livestock density. It is a 20-year plan destined to fail.

This example of inadequate springs restoration actions applies to all 24 of the impaired Outstanding Florida Springs. None of these BMAPs have a reasonable chance of success because they do not confront and curtail the major sources of nitrate pollution. Two thirds of this pollution is from agriculture and the remaining third is from urban fertilizer runoff and human wastewater.

Fortunately, the Florida Springs Council and eight additional petitioners decided to challenge DEP on a representative group of these inadequate springs BMAPs that includes Silver, Rainbow, Santa Fe, Suwannee, Wekiva and Volusia Blue springs.

At the November administrative hearing in Tallahassee, DEP argued that their BMAPs do everything allowed by law but may still not achieve success.

DEP invested thousands of hours of staff time and many hundreds of thousands of taxpayer dollars to prepare and defend these inadequate BMAPs.

The Florida Springs Council's rule challenge was supported by volunteer services and private donations from individuals with no economic interest in the outcome.

The petitioners' challenges to these flawed springs BMAPs were brought with the sole purpose of proving to the administrative law judge that the BMAPs must be significantly improved or Florida's springs are doomed.

On a personal note, this is my fifth springs-related administrative challenge. The first two were battles over groundwater extraction permits issued to Frank Stronach's Sleepy Creek Ranch, a.k.a. Adena Springs. Thousands of private citizens opposed this for-profit groundwater grab.

The next hearing focused on the emergency and final minimum flows for Silver Springs, allowing additional flow reductions in one of our state's most imperiled water bodies. St. Johns River Water Management District lawyers and staff used substantial public resources and personal intimidation to defeat the concerned public's attempt to save Silver Springs from additional flow depletion.

These three unsuccessful administrative challenges convinced me that some government leaders will stop at nothing to serve special interests. When the goal is restoration and protection of Florida's priceless springs, one must learn from one's failures and try again.

This year, I have had the opportunity to testify and present the best available science during two additional administrative hearings, the Rainbow Springs minimum flows challenge and the Outstanding Florida Springs BMAP challenge. Neither case has been decided, but I am confident that in both hearings the facts speak for themselves and the administrative law judges have the evidence they need to improve these flawed agency actions.

Robert Knight, PhD, is executive director of the nonprofit Howard T. Odum Florida Springs Institute and is a member of the executive committee of the Florida Springs Council.

Calendar

December

DEC. 16-20 – Course Wastewater Class A Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 19-20 – Course Backflow Prevention Recertification, Pensacola, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

DEC. 20 – Course Asbestos: Awareness (Class IV) Initial, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

January 2020

JAN. 6-10 – Course: Backflow Prevention Assembly Tester Training and Certification, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

JAN. 6-10 – Course: Wastewater Class C Certification Review, Davie, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 8-10 – Course: Initial Training Course for Landfill Operators and C&D Sites - 24 Hour, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

JAN. 8-9 – Course: Initial Training Course for Transfer Station Operators and Materials Recovery Facilities - 16 Hour, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

JAN. 8-9 – Course: Refresher Training Course for Experienced Solid Waste Operators-16 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 8 – Course: Refresher Training Course for Experienced Solid Waste Operators-8 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 8-10 – Course: Initial Training for Operators of Landfills and Waste Processing Facilities, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

JAN. 8 – Course: Refresher Training Course for Experienced Solid Waste Operators - 4 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 8 – Course: Refresher Training Course for Experienced Solid Waste Spotter - 4 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 9 – Course: Refresher Training Course for Experienced Solid Waste Operators-8 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 9 – Course: Refresher Training Course for Experienced Solid Waste Operators - 4 Hours, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 9 – Forum: CFX Industry Forum, Orlando, FL. Presented by Central Florida Expressway Authority. Email edward.gonzalez@rsandh.com.

JAN. 9 – Seminar: Water Resources, Reuse, and Resiliency Seminar, Tampa, FL. Presented by the Florida Water Environment Association. Call (407) 574-3318 or visit www.fwea.org.

JAN. 9-10 – Course Backflow Prevention Recertification, Kennedy Space Center, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 10-11 – Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 11-29 – 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.

JAN. 13-17 – Course: Backflow Prevention Assembly Tester Training and Certification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 13-17 – Course: Water Class A Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 14 – Course: Introduction to Lift Station Maintenance, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 15 – Showcase: FSAWWA MAC New Technology & Training Showcase, Tallahassee, FL. Presented by the Florida Section of the American Water Works Association. Contact Mark McDowell at (727) 403-7614 or visit www.fsawwa.org.

JAN. 24 – Conference: 29th Annual Southwest Florida Water Resources Conference, Fort Myers, FL. Presented by the Florida Section of the American Water Resources Association. Email info@awraflorida.org or visit www.awraflorida.org.

JAN. 26-28 – Summit: 2020 SWANA FL/RFT Joint Summit. Orlando, FL. Presented by the Florida Sunshine Chapter of the Solid Waste Association of North America and Recycle Florida Today. Call (727) 940-8855 or visit swanafl.org.

JAN. 27-30 – Course: Backflow Prevention Assembly Tester Training and Certification, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 27-29 – Course: Asbestos: Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

JAN. 27-31 – Course: Wastewater Class A Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

Florida Specifier

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Every issue, we publish this calendar of environmental industry events...have been for over 40 years. It's the most comprehensive calendar available of local events here in Florida and regional/national events of interest to Florida's environmental professional community.

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ASBESTOS COURSES

Asbestos: Contractor/Supervisor
Mar. 2-6, 2020 | Gainesville, FL | CEUs: 3.5

Asbestos: Inspector
Jan. 27-29, 2020 | Gainesville, FL | CEUs: 2.1

Asbestos: Management Planner
Jan. 30-31, 2020 | Gainesville, FL | CEUs: 1.4

Asbestos: Project Design
Apr. 7-9, 2020 | Gainesville, FL | CEUs: 2.4

Asbestos Refresher: Inspector
Feb. 18, 2020 | Gainesville, FL | CEUs: 0.4
Course also available online

Asbestos Refresher: Management Planner
Feb. 18, 2020 | Gainesville, FL | CEUs: 0.4

Asbestos Refresher: Contractor/Supervisor
Nov. 7, 2019 | Gainesville, FL | CEUs: 0.8
Course also available online

Asbestos: Cement Piping (Class II) Initial & Refresher
Course can be brought to your location

WATER & WASTEWATER COURSES

Wastewater Class A Certification Review
Dec. 16-20, 2019 | Gainesville, FL
Jan. 27-31, 2020 | Gainesville, FL

Water Class A Certification Review
Jan. 13-17, 2020 | Gainesville, FL

Introduction to Lift Station Maintenance
Jan. 14, 2020 | Gainesville, FL | CEUs: 0.8
Mar. 2, 2020 | Gainesville, FL | CEUs: 0.8

Microbiology of Activated Sludge
Jan. 28-30, 2020 | Gainesville, FL | CEUs: 2.2

Water Class B Certification Review
Feb. 3-7, 2020 | Gainesville, FL

Activated Sludge Process Control & Troubleshooting
Feb. 10-13, 2020 | Gainesville, FL | CEUs: 2.5

Water Class C Certification Review
Feb. 24-28, 2020 | Gainesville, FL

Wastewater Class C Certification Review
Mar. 16-20, 2020 | Gainesville, FL

Wastewater Class B Certification Review
Mar. 23-27, 2020 | Gainesville, FL

BACKFLOW PREVENTION COURSES

Backflow Prevention Assembly Tester Training & Certification
Jan. 6-10, 2020 | Lake Buena Vista, FL
Jan. 11-29, 2020 | Tampa, FL*
Jan. 13-17, 2020 | Gainesville, FL
Jan. 27-30, 2020 | Jacksonville, FL
Feb. 3-7, 2020 | Destin, FL
Feb. 5-8, 2020 | Ft. Myers, FL
Feb. 21-29, 2020 | Venice, FL**
Feb. 22- Mar. 1, 2020 | Tampa, FL*
*Two consecutive Sat. & Sun. **Two consecutive Fri. & Sat.

Backflow Prevention Assembly Repair and Maintenance Training & Certification
Jan. 10-11, 2020 | Venice, FL
Feb. 5-7, 2020 | Lake Buena Vista, FL
Mar. 30 - Apr. 1, 2020 | Gainesville, FL

Backflow Prevention Recertification
Dec. 19-20, 2019 | Pensacola, FL
Jan. 31 - Feb. 1, 2020 | Jacksonville, FL
Feb. 1-2, 2020 | Tampa, FL
Feb. 3-4, 2020 | Lake Buena Vista, FL
Feb. 6-7, 2020 | Gainesville, FL
Feb. 10-11, 2020 | Destin, FL
Feb. 22-29, 2020 | Miami Lakes, FL
Mar. 7-8, 2020 | Tampa, FL
Mar. 9-10, 2020 | Altamonte Springs, FL
Mar. 11-12, 2020 | Ft. Myers, FL
Mar. 20-21, 2020 | Tallahassee, FL

30th Annual Cross Connection Control Conference
February 19-20, 2020
Daytona Beach, Florida

SOLID WASTE COURSES

Initial & Refresher Solid Waste Courses
Jan. 8-10, 2020 | Gainesville, FL
Feb. 18-20, 2020 | Daytona, FL
Mar. 16-18, 2020 | Crestview, FL
Courses also available online

Landfill Design and Construction
Mar. 23-27, 2020 | Gainesville, FL

TRAIN THE TRAINER COURSES

Train the Trainer: How to Design & Deliver Effective Training
Feb. 18-20, 2020 | Gainesville, FL | CEUs: 2.4

www.uftreeo.org | (352) 392-9570

entry.

Even though Congress appropriated its $1.2 million budget, former Interior Department Sec. Ryan Zinke and Agriculture Department Sec. Sonny Purdue opposed its continuation. The two department heads that most benefitted from the committee's activities said they wanted to better utilize the funds for those activities.

Had this council been active more than a decade ago, it might have prevented two disasters in Florida agriculture.

Florida's citrus industry has been decimated by two invasive species from Asia. One is the psyllid wasp that has reduced citrus to a niche crop. In addition, the avocado industry and the native bay laurel tree have been heavily damaged by the introduced ambrosia beetle.

Both of these invasive insects introduce a bacterial or fungal infection into host plants. The infection is often lethal or reduces crop production almost entirely.

Mosquito-borne diseases are another example of significant problems caused by introduced invasive species.

New drinking water lead rule. The EPA recently proposed a new rule to restrict human exposure to lead in drinking water.

The beneficial part of the rule increases oversight of lead in drinking water. It requires all schools and daycare centers to be tested for lead. If lead is found, parents or caretakers must be notified within 24 hours. The current rule allows 30 days for notification.

A second new notification stipulation requires public drinking water utilities to inventory their lead service pipes and notify the public of their locations.

The proposed rule has glaring omissions regarding the replacement of lead service lines that health advocates hoped would be addressed. The new rule does not require replacement of lead pipe service connections.

If an analysis of a public water supply system shows that its water contains more than 15 parts per billion lead, it has to replace three percent of its lead service lines annually. Health advocates wanted to see a seven percent service line replacement annually.

Experts estimate that the reduced replacement requirement from seven to three percent annually could extend from 13 to 33 years, the time needed to replace the six million lead pipe service connections currently in use.

This effect, health advocates said, dilutes whatever beneficial effect increased surveillance in schools has by vastly increasing lead health risks at home.

U.S. wind generating capacity. At the end of October, U.S. wind generating capacity exceeded 100 gigawatts for the first time.

In the third quarter of 2019, 1,927 megawatts of wind power capacity were commissioned. This additional new wind generating capacity pushed the U.S. total capacity over the 100 gigawatts milestone.

U.S. electricity generation by wind was 273 billion kilowatt hours in 2018. That is just 6.5 percent of the total 4,171 billion kilowatt hours of total U.S. electricity production by utility-scale generators.

The 2018 data is the most recently available tally from the U.S. Energy Information Administration.

The 100-gigawatt milestone translates to meeting the electricity demands of 32 million American homes and 500 U.S. factories. It supplies over $1 billion of revenue to rural communities.

Texas, the leading state for wind-generated electricity, has 27 gigawatts of cumulative capacity, referring to what the state could produce not what it does produce.

The largest increase in U.S. wind-generated electricity is likely to come from offshore wind farms.

If the country's nascent offshore wind electricity production ramps up, it could equal what Texas currently produces within a few years.

ASTM environmental assessment standards. In November, ASTM International announced plans to revise two standards.

The first, D6008, deals with environmental baseline surveys. The committee also proposed to modify D5746, which promulgates standards to classify the environmental condition of property area types for disposition and transfer of federal facilities and property under the Base Realignment and Closure Program and for other processes that require classification of environmental condition.

Federal government agencies are the primary users of these standards.

In a press release describing its new initiative, an ASTM spokesperson said that the committee would like to add new members to increase participation of officials involved in property acquisition and disposal. ASTM also desires greater environmental consultant involvement.

Those who wish to work on this effort by becoming a committee member may get additional information online at www.astm.org/join.

The group will hold a conference call on Jan. 14, 2020, at 2:00 p.m., Eastern time. The committee contact is Molly Lynyak. She can be reached at (616) 832-9743.

Water Workforce Initiative. The EPA launched a Water Workforce Initiative to help recruit and train "clean water professionals." In its release, the agency cited a critical staffing shortage of trained professionals to operate and maintain drinking water and wastewater infrastructure.

The agency noted that it expects the retirement of one-third of all drinking water and wastewater operators over the next 10 years. They noted that these positions may go begging because there is limited awareness of water careers, and recruiting and retention of high-tech skilled workers to fill positions is difficult.

The EPA is collaborating with the Water Environment Federation among other groups and organizations to promote its Water Workforce Initiative. Other collaborators include the Department of Veteran Affairs to recruit eligible veterans and the Department of Labor to support water operator apprenticeship programs.

In early 2020, the EPA intends to release a draft Water Workforce Initiative.

Final risk rules passed. The EPA passed its final Risk Management Plan for the first time in January, 2017. It rescinded many key components of an Obama administration rule that forced facilities with specified activities or contents to coordinate with local authorities to improve emergency avoidance and response plans.

It also required public disclosure of the risks and public notification of emergency responses such as evacuation routes.

The first rule, although gutting public protections, remained unacceptable to industries who demanded more confidentiality for the risk their activities posed to the public around facilities and factories.

In 2018, the EPA proposed to further amend the rule and finalized that rule in November, 2019.

The latest rule rescinded requirements for safer technology and alternative analyses, third party audits, incident investigations, information disclosure to the public and what the EPA characterized as several "minor regulatory changes."

More directly applicable to risk management, the EPA also modified amendments to local regulation, emergency exercises and public meetings, and changed compliance dates.

The agency proposed the changes to reduce "potential security risks associated with information disclosure requirements in the first amendment."

The agency cited unnecessary regulation and regulatory costs, concerns that the EPA did not coordinate rulemaking with OSHA, and other issues.

The new rule will prevent public disclosure of risks and no longer require companies to engage in cooperative training of the local community's first responders for effective action in the case of a fire or explosion. It seems to do little to require facility owners to take timely and effective action to improve facility safety.

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ALGAE

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ness of specific projects has not been assessed due to lack of available monitoring data."

Even where the necessary efforts have been made, BMAP implementation confers no ability to show whether it has been worth the effort and investment.

The report encouraged incorporation of information about land use alterations in areas affected by rapidly changing demographics to make projections of nutrient mobilization. Such incorporation, it wrote, will "inform land use planning and permitting."

Agricultural BMPs

This section began with the statement: "In watersheds where agriculture is the predominant land use, it should not be surprising that agriculture is also the dominant source of both phosphorus and nitrogen."

The report noted that enrollment of farmers in Lake Okeechobee basin's agricultural best management practices is considerably less than in other areas. South Florida algae problems occur because a quarter of the farmers there openly defy the use of BMPs. The report recommended quick action to correct this.

Once enrollment reaches an appropriate level, the task force recommended that additional efforts to ensure compliance be designed and enforced, including requiring accurate record-keeping, verification of the records and increased availability of the records for analysis and review.

The task force also suggested that BMP manuals include an estimate of nutrient input reductions associated with the practices described. This is not currently required.

In addition, BMP manuals should be updated by the Florida Department of Agriculture and Consumer Services on an accelerated basis.

BMPs require that best available technologies be used but its manuals do not specify what technology is available. The task force suggested that when manuals are updated, best available technology candidates should be listed.

Septic tanks

The report noted that 2.5 million septic systems treat approximately one-third of Florida's wastewater. Nutrients from these systems are substantial contributors to harmful blue-green algae blooms.

The task force recommended that DEP develop a comprehensive regulatory program that ensures septic tanks and on-site wastewater systems are sized, designed, constructed, installed, operated and maintained to prevent nutrient pollution.

This explicitly means that the unitary authority that the Florida Department of Health now exercises over on-site wastewater systems be shared with the Florida Department of Environmental Protection.

In its new role, DEP would develop and implement a septic system inspection and monitoring program to identify improperly functioning and failing systems. Corrective actions should be developed and enforced to reduce nutrient pollution at the same time maintaining septic systems primary role of protecting human health.

The committee also recommended a

ALGAE
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NOTES

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to 15,000 homes. The energy is sold to Tampa Electric Co.

The city will operate the facility as an enterprise fund supported by user-fees rather than taxes. Because the city does not have to generate a profit, they can use funds in excess of operating costs to perform needed maintenance and make upgrades to the 34-year-old facility.

"The number of unscheduled outages has increased in recent years. Consequently, there has been an increase in the amount of solid waste that has been transported to other sites for disposal," noted Mark Wilfalk, director of the city's Department of Solid Waste & Environmental Program Management, in a memo to the Tampa City Council in October.

"This situation has been exacerbated over the last few years because the amount of solid waste generated in the city has increased as a result of new residential and commercial development. These factors have contributed to an increase in the city's expenditures for transporting solid waste."

Strategies to address climate change. DEP is working on a statewide plan to address the impacts of climate change. Alex Reed, director of DEP's Division of Water Resource Management, provided details on the state's strategy for coastal resiliency to the House of Representatives' Agriculture and Natural Resources Subcommittee in October.

Coastal resiliency is a fundamental tenant of Gov. Ron DeSantis' executive order protecting natural resources. It established the Office of Resilience and Coastal Protection to address climate change, coastal flooding and erosion.

The office will manage 4.5 million acres of submerged lands and coastal uplands, and coordinate with local governments to manage 825 miles of shoreline.

The Florida Resilient Coastlines Program is comprised of 120 local, state and federal agencies, university experts, community stakeholders, industry professionals and conservation organizations.

The group helped develop the comprehensive Florida Adaptation Planning Guidebook to assist communities in vulnerability assessment, development and implementation of adaptation strategies and funding development. The guidebook includes examples of vulnerability assessment and adaptation plans.

To date, the Florida Resilience Coastline Program has spent over $5 million to assist in planning and initiating over 60 community projects representing 35 percent of the coastal communities in Florida.

TECO solar. The Tampa Electric Co. is on track to significantly expand its use of solar power.

The utility recently received approval from the Florida Public Service Commission for two new solar projects in Hillsborough County including 74.8- and 74.5-megawatt facilities.

TECO announced plans to add six million solar panels in 10 new photovoltaic solar projects, for a total of 600 MW over the next three years. The expansion will provide electrical power to more than 100,000 homes.

Upon completion, seven percent of TECO's energy generation will come from the sun, making them the power generator with the highest percentage of solar utilities in Florida.

Proposed projects include Balm Solar at 74 MW, Grange Hall Solar at 61 MW, Lithia Solar at 74 MW and Wimauma Solar at 74 MW.

Indian River living shoreline. The Florida Fish and Wildlife Conservation Commission awarded a $27,300 grant to establish a living shoreline along approximately 120 feet of the Indian River. The project is within the Jones Pier Conservation Area along the Jungle Trail.

Living shorelines are created using natural materials such as native plants, shell, sand and rock. They provide habitat for plants and animals, protect and stabilize the coastal edge and improve water quality.

The Jones Pier Conservation Area was purchased by Indian River County in 2011 from the Jones' family with assistance from the Florida Communities Trust.

The county committed to implementing an ecological restoration management plan for the site while concurrently using it for public access as well as educational and historical exhibits.

People news. Richard Tschantz has joined Carlton Fields in its government law and consulting practice in Tampa. Tschantz recently served as general counsel of the Environmental Protection Commission of Hillsborough County. Before that, he was deputy general counsel of the Southwest Florida Water Management District.

Company news. Orlando-based environmental construction and consulting firm Revive ENV Inc. announced the kickoff of its first major project in South Florida in November.

Revive will oversee the abatement, air clearance and select demolition of a 186-unit apartment complex and expects the job to be completed within a year.

Revive was launched in early 2019. Its founder, Jim Cohen, has over 15 years of environmental experience in waste disposal, remediation, emergency spill response and industrial services.

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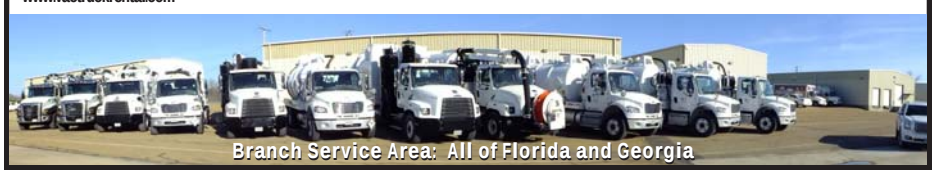

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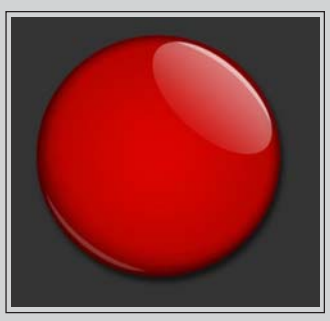

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FLOOD

From Page 8

watersheds that (drain) into Lake Okeechobee," said Gene Duncan, water resources director for the Miccosukee Tribe of Florida.

Duncan noted that the water management district's summary of five years of water quality data shows that the upper Kissimmee contributes 30 percent of the water to the lake and 15 percent of the phosphorus; the lower Kissimmee contributes 18 percent of the water and 17 percent of the phosphorus; Taylor Creek contributes 7 percent of the water and 21 percent of the phosphorus; and Fish Eating Creek contributes 12 percent of the water and 12 percent of the phosphorus. None of these sources are addressed by the plan.

While Duncan indicated respect for the Seminole position, he noted only the water quality in Indian Prairie in the southwest portion of the basin is being properly addressed.

Corps and district officials state that the project will "increase water storage capacity in the watershed, resulting in improved Lake Okeechobee water levels, improve the quantity and timing of discharge to the St. Lucie and Caloosahatchee estuaries restore wetlands and improve water supply for existing legal users."

Management of water levels and discharges from Lake Okeechobee are critical to the prevention of algal blooms resulting from discharges to the coasts.

The flow of water into Lake Okeechobee significantly exceeds the capacity for outflow. When water levels in the lake reach a critical capacity, water needs to be released in order to ensure the integrity of the massive dike surrounding the lake.

"The volume and frequency of undesirable freshwater releases to the east and west lowers salinity in the estuaries, severely impacting oysters, sea grasses and fish," noted corps' officials. "High nutrient levels adversely affect in-lake water quality, estuary habitat and habitat throughout the Greater Everglades."

Time will tell whose priorities will win out.

WASTEWATER

From Page 5

"NEWgen eliminates this pain by actively converting organic solids to biogas. In over a year of operation in South Africa, it has not required desludging."

NEWgen is simple to operate, flexible in applications and highly efficient, he added. Each unit is capable of serving 100 people a day. Yeh and his team are working on advancing the technology to serve up to 1,000 people a day.

The NEWgenerator is also well suited for use in emergency recovery.

"NEWgen is highly suitable for emergency response by providing a 'plug and play' instant infrastructure," Yeh said. "It operates entirely on solar energy, so it can operate even when grid power is interrupted or when diesel fuel is not available."

It is compact and can be deployed inside cargo planes. Installation is quick. Depending on the site, commissioning and startup can occur in as little as a day. The entire system is automated with minimal operator intervention required, and can be remotely monitored and controlled, he said.

USF's NEWgenerator has not been limited to earthly endeavors. NASA awarded a one-year seed grant to Yeh's team in 2018. The space agency has successfully been treating and recycling near-space wastewater for years and are interested in NEWgen as a potential technology for deep space and Mars exploration in the future.

To facilitate space travel, the unit will need to be smaller, completely sanitary and operational in zero gravity. NEWgenerator is attractive because it provides nutrients valuable to growing food, a necessity for long-term space and planetary exploration.

The technology employs a multi-stage disinfection process. According to USF data, a fine-pore microscopic membrane filter traps bacteria and viruses.

Clean water that passes through the filter is then disinfected with chlorine, similar to the municipal drinking water process. The recycled water can be used to flush toilets and for irrigation, reducing water demand.

The heart of the technology is the anaerobic membrane bioreactor, considered state-of-the-art in wastewater treatment and water recycling with potential for net-positive operation—more energy recovered from the waste than expended to treat it.

The use of membranes allows process intensification and significant size reduction. USF technical publications indicate that NEWgen is believed to be the first anaerobic membrane bioreactor engineered into a form that is "portable, modular, autonomous and entirely solar powered."

The system is automated and self-powered by a system of photovoltaic panels and batteries. Test units are housed in mini-shipping containers.

USF considers the unit ready for commercial launch. A number of patents are pending for its release and mass production.

"We are currently working with various commercial partners to mass produce NEWgen," Yeh said. "It is anticipated that NEWgen will be commercially-available in 2020."

MICROPLASTICS

From Page 1

upper and middle Tampa Bay. Samples taken in lower Tampa Bay, which is heavily influenced by tidal flushing by Gulf of Mexico water, did not show a rainfall-associated microplastic abundance spike.

Now, at least in Florida's estuaries, stormwater runoff can be included as a significant source of microplastics.

"Increased rainfall due to climate change in areas already prone to rain will increase the runoff coming from the land to the bay, potentially bringing greater amounts of microplastics through the storm drains," said Kinsley McEachern, MS, a marine science graduate student at the University of South Florida at St. Petersburg who led the research.

This is both a novel and important aspect of microplastic fibers in aquatic environments.

Degraded and fractured plastic particles from water bottles, plastic bags and other plastic trash are additional sources of microplastics in Tampa Bay, but far smaller quantitatively.

Regardless of their source and chemical composition, microplastics are extremely long-lived in water and sediments.

"Plastic smog" is a term used to characterize microplastics in natural waters. David Hastings, PhD, courtesy professor at the USF College of Marine Science, used the term to describe microplastic pollution in Tampa Bay.

Hastings strongly encourages additional research to get a better understanding of the biological effects of the material in aquatic ecosystems.

Microplastics are widely suspected of interfering with filter feeders and plankton grazers, but information on biological effects are scant at this point.

McEachern noted that her interest in the subject originated following observations of brightly colored plastic particles in the guts of microscopic plankton viewed under a microscope.

McEachern led the research and wrote the report recently published in *Marine Pollution Bulletin*. Hastings was the research project's principal investigator.

The study's co-authors were associated with the University of South Florida, Eckerd College, and the Environmental Protection Commission of Hillsborough County.

Plastics will last longer than a human lifetime and cannot be removed to any extent from surface waters.

"The only way to alleviate the impacts of single-use plastic in our bay, ocean and marine environments is to turn off the tap and cut off using it at the source," said McEachern.

25th Annual Florida Remediation Conference: Notes from the trenches

Staff report

Advanced Environmental Laboratories Inc. is now the 10th largest employer among labs nationally and the largest small business laboratory in the country.

They are moving into the federal marketplace and recently added two new staff members, Steve Warren, federal business director, and Debra Elliot, national accounts manager.

The lab is also expanding its state certification list throughout its national footprint and are completing a facility expansion at their Jacksonville headquarters to analyze PFAS/PFOA and emerging contaminants including pharmaceuticals and personal care products.

The NRC family of companies became part of US Ecology in November. US Ecology is celebrating its 10th year in business and anticipates exceeding $1 billion in revenue in 2020. They are growing and adding new assets including heavy equipment and trucks to their fleet.

Preferred Drilling Solutions Inc. opened its sixth Florida location with a new office in Pompano Beach and added sonic drilling technology to its service offerings.

PDS is licensed throughout the Southeast U.S. and is currently running up to 20 crews a day.

DeWind One Pass Trenching now has the capacity to trench to 125 feet below land surface. DeWind's one-pass trencher can mix a seven-foot-wide bentonite or cement bentonite homogenized barrier wall in-situ.

In addition, they can now install groundwater collection trenching up to 50 feet deep in one pass.

Native soil is removed from the trench and replaced with gravel or sand, while concurrently setting sump pumps and up to 50 feet of subsurface collection pipe.

The state of Florida signed off on the use of Regenesis' Petrofix liquid carbon suspension. Petrofix is a petroleum remediation substance that contains micron-scale activated carbon in combination with slow and quick-release inorganic soluble electron acceptors that stimulate biodegradation.

The company plans to continue developing colloidal reagent technologies in the coming year.

Groundwater Protection Inc. acquired two new long-stroke sonic drill rigs. They are starting two new projects including installation of air sparging at a NASA site and drilling services for a Superfund site in DeLand.

ExoTech Inc. opened a new office in Birmingham, AL, and added construction and concrete recycling to their services. Randy Dalton joined the firm in the new Birmingham office.

ExoTech is also expanding into the brownfields and soil-blending sectors focusing on chlorinated solvent, petroleum and metals remediation.

Total Vapor Solutions now serves clients in 38 states in the U.S. in addition their international clients.

TVS assesses subsurface vapor intrusion to assure the health and safety of on-site workers and people living in the vicinity of contaminated sites, and operates in compliance with U.S. Environmental Protection Agency technical guidance for the assessment of vapor pathways.

Vertebrae Well Systems has installed 563 horizontal wells and seventeen miles of piping. They are installing more "blind wells" that don't exit the ground at the terminus allowing the wells to stay within the limits of access agreements.

OSC Inc. is performing a nuclear and radioactive contamination cleanup for a dismantlement project at Washington State Hospital in Seattle, WA.

Clean Vapor Inc. is opening an Atlanta, GA, office. Their patented technology provides dynamic control for installation of large-scale sub-slab vapor management systems.

Their system addresses seasonal and temperature variations within a protected building envelope.

SiREM recently completed its first field injection of a newly developed bioaugmentation bacterial culture that can degrade benzene under anerobic conditions. In addition, Brent Pautler has joined the firm as customer service coordinator.

Universal Engineering Sciences Inc. recently added Dennis Glavin to its staff as national account manager for environmental services.

UES continues to expand, adding offices in Washington, DC, and Charlotte, NC. The firm now has 18 offices throughout the Southeast U.S.

Thank you for 25 years

At lunch on Day Two of FRC 2019, I announced the sale of the FRC conference to Tallahassee-based SWIX and Gene Jones, the perfect man to pick the conference up from here and run with it for the next 25 years.

Together, we've created a close-knit community of remediation industry professionals willing to work shoulder to shoulder to help solve the trickiest, most complex soil and groundwater contamination issues.

Over the years, I have come to know many of the wonderful people who work in this business. Some have become good friends.

To all of you, thank you for your support. Have a great 2019 holiday season and an ever better 2020.

And keep up the good work.

Mike Eastman

FRC

From Page 1

with Kerfoot Technologies Inc. in Mashpee, MA, described a coupled reagent method and recirculating in-situ process for degrading PFOA compounds in groundwater. The process relies on coated ozone microbubbles.

His process is an application of a coupled reaction with sufficient combined energy to break the carbon-fluorine bond. In a prior FRC conference, Kerfoot proposed that a coupled reaction would be key to a useful chemical destruction process.

The details are patented, but his results indicate the process to be effective.

Coupled reactions are the basis of cellular catabolic reactions, those that take energy from breaking chemical bonds in one compound and applying the energy to create or modify chemical bonds in a different compound.

Paul Hatzinger, PhD, director of the Biotechnology Development and Applications Group at APTIM Federal Services LLC in Lawrenceville, NJ, described the use of the same concept of coupled reactions, in this case implemented by microorganisms stimulated with ethene or other hydrocarbon gases, to degrade emerging contaminants of concern in groundwater.

The talk presented by Rosa Gwinn, PhD, PG, resource and technology manager with AECOM in Germantown, MD, featured delineating PFOS contamination at a site without being overwhelmed by uncertainties in the absence of verified analysis and standards for cleanup levels. The tone of her comments contrasted with some of the more dire impressions of other industry experts.

Gwinn described a sampling method for "bounding uncertainty." This heuristically defensible procedure provides useful information about areas on a PFOA-contaminated property where the source contamination lays.

This talk bought a focus on what remediation specialists can effectively do now. It was a worthwhile contrast to a spreading impression of a PFOA doomsday scenario.

DEP PRP

This year's Regulatory Session brought the news that the Florida Department of Environmental Protection Petroleum Restoration Program's near-future trajectory is a transition from their Low-Scored Site Initiative used to delist as many sites as possible. That successful delisting effort picked most of the low hanging fruit, successfully accomplishing its mission.

PRP will now shift its focus to actual remediation efforts on sites where contamination requires remediation to reach clean up targets.

PRP Program Administrator Natasha Lampkin reiterated the need for owners of contaminated property to authorize site access to DEP officials so they can initiate site assessments and cleanups.

The clear message to consultants is to persistently encourage their clients to allow access so remediation efforts can proceed.

Exhibit hall

This observer enjoys the exhibits because they provide a glimpse into implementation of the good ideas that have so often been the subject of technical presentations in prior years.

This year, over 110 companies were on hand to exhibit at FRC, a record number. That increase reflected a greater diversity of professional services, reagents and technology than ever before.

New technology, in particular, included new names and faces offering specialty chemicals and reagents, cybertechnology and biotechnology.

Biotechnology solutions ranged in sophistication from simple but effective vegetation sources for use on remediation sites to cutting-edge bioengineered microorganisms and media to improve chlorinated solvent degradation.

The high quality of each of the cleanup products and services offered was notable, as was the opportunity to ask questions and receive the most authoritative answers.

Next year, the Florida Remediation Conference begins its second quarter-century. Who could have predicted 25 years ago that Florida's remediation enterprise would progress this far beyond dig and haul for soil cleanup and pump and treat to clean up groundwater?

Even those with great faith in the prospects ahead for environmental remediation would reasonably admit that the speed of its development has more than exceeded expectations. And the place to see that progress up close will continue to be the annual Florida Remediation Conference.

Several images from the 25th Annual FRC, thanks to Gene Jones and Roy Laughlin.

DEP acquires additional acreage within Wakulla Springs Protection Zone

Staff report

The Florida Department of Environmental Protection purchased 717 more acres within the Wakulla Springs Protection Zone Florida Forever project.

The acquisition of the property represents a successful multi-agency public and nonprofit partnership between DEP, the U.S. Forest Service, the Florida Forest Service and Conservation Florida to protect water quality within the Wakulla Springs Basin.

The acquisition protects the springshed and the land that feeds Wakulla Springs, one of the largest and deepest artesian springs in the world.

The property also buffers and protects an additional 13 karst features with hydrological connections to the Floridan Aquifer. Aquifer recharge provided by the property is essential to water quality and quantity at Wakulla Springs and the Big Bend Seagrasses Aquatic Preserve along St. Marks River shorelines in Apalachee Bay.

"This is a big win for Florida and Wakulla Springs," said Conservation Florida Executive Director Traci Deen. "Wakulla Caves is a North Florida gem that protects freshwater resources, offers world-class scuba diving and recreational opportunities, and solidifies a conservation corridor with key habitat for native plants and wildlife."

Florida Forever is the state's conservation lands acquisition program. The Florida Department of Environmental Protection is the lead agency for the program.

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ALGAE

From Page 13

one-acre rule for septic tank placement. A one-acre rule has been adopted in state springsheds and the report recommended it be used elsewhere.

In areas where the one-acre rule cannot be implemented because of existing density, the task force recommended additional legislation and funding for septic-to-sewer conversion programs.

Sanitary sewer overflows

In the last 10 years, DEP and DOH have focused more on sanitary sewer overflows than on septic tank effluent. The report recommended a more proactive approach that includes requiring wastewater utilities to install power backups for lift stations installed before 2003.

A proactive approach to inspect and correct infiltration issues to reduce sanitary sewer overflows was also recommended. This may require additional legislation.

Stormwater treatment

Stormwater treatment systems have increasingly been identified as a primary conveyor of nutrients to lakes, rivers and estuaries. The task force recommended that stormwater treatment systems be subject to inspection and monitoring.

Stormwater system design criteria should be revised and updated to include stormwater treatment technologies that have been demonstrated as effective and beneficial.

Innovative technologies

The report endorsed investment in "a diverse portfolio of technologies, focusing on those that are demonstrably cost-efficient, environmentally safe and scalable."

At the same time, the report noted that technologies that are focused on the cleanup and mitigation of blue-green algae blooms are important but should not consistently dominate expenditures.

The committee urged the use of technologies that are prevention-focused as the best and most effective investment. The task force also recommended technologies for the detection, monitoring and forecasting of harmful algal blooms.

Public health effects

While the task force advised against spending too much money on control of algal blooms themselves and acknowledged that the occurrence of the blooms is of increasing public concern, the "science to address concerns is limited."

They outlined some critical need-to-know categories that included better characterization of acute and chronic health effects for domestic animals, wildlife and humans exposed to algal toxins.

They recommended regular and proactive sampling for algal toxins in water, and easy public access to the test results.

In addition, DOH should establish defensible health advisories and DEP should do the same for defensible water quality criteria. Both agencies need a "transparent, consistent and comprehensive communication plan" to provide the public with information about algal blooms.

Science, data, monitoring

As the state implements a more rigorous program to reduce harmful algal blooms, it must be accompanied by a statewide comprehensive water quality monitoring strategy to address status and trends of key water quality parameters. And the strategy has to be appropriately scaled.

Sampling and monitoring should be "appropriate to answer specific questions, address unknowns and allow for improved design and adaptive management of agricultural and urban BMPs, regional projects and BMAPs."

The task force also advised that additional research is necessary to "inform monitoring efforts."

The report noted that its primary focus, if not its primary reason for existence, is algal blooms in Lake Okeechobee that spread due to surface water drainage to Atlantic and Gulf Coast estuaries.

In this region, the report specifically endorsed expanded construction of stormwater retention and treatment areas.

The Blue-Green Algae Task Force report focused on South Florida with occasional recommendations for other regions affected by the same conditions that predominate in South Florida. But its mandate does not end with this report.

The task force noted that it will delve into other important issues including wastewater, water reuse, biosolids, fertilizers, urban landscapes, the role of conservation lands and wetlands, maintaining water quality and the application of herbicides.

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