Florida Specifier

Practical Information For Environmental Professionals

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

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North Port water system resumes normal operations

By PRAKASH GANDHI

Drinking water supplies in the Southwest Florida city of North Port are safe following a fuel spill during a fatal truck crash, according to city officials.

In late September, a tanker truck overturned on 1-75 south just past Sumter Road, resulting in a fuel release of 4,050 gallons of gasoline and 100 gallons of diesel fuel.

The spill was contained as soon as possible and the R-80 ditch was bermed up in order to prevent further migration. Most of the floating fuel product was removed and disposed of.

Juliana Bellia, North Port's public works director, said some of the fuel entered Myakkahatchee Creek, which is a potable water source for the city.

The city shut down the portion of the water treatment plant taking in water from the creek until samples could be analyzed to determine the safety of the city's drinking water supply.

Meanwhile, the city pulled its water supply from the Peace River Water Treatment Facility through interconnects.

The city also has the ability to pull water from Sarasota County interconnects, if needed.

City officials said that due to the high volume of water in the city storage system, no potentially contaminated

SPILL
Continued on Page 16

Photo courtesy of Ohio State University

New research indicates that underground water flow is a significant contamination route to the oceans. Above, Professor Audrey Sawyer, assistant professor in the School of Earth Sciences at Ohio State University, places instruments to measure subterranean water flow. See story on Page 7.

EPA releases cleanup plan for Kerr-McGee Superfund site in Jacksonville

By ROY LAUGHLIN

The U.S. Environmental Protection Agency released its proposed cleanup plan for the former Kerr-McGee Chemical Corp. site in Jacksonville.

The property on Talleyrand Avenue on Jacksonville's east side is one of Florida's oldest and most polluted chemical industry sites.

In 1893, the Wilson & Toomer Fertilizer Co. began synthesizing fertilizer there, contaminating the site with arsenic and lead from kilns producing sulfuric acid from pyrite.

After World War II, the Kerr-McGee Chemical Corp. used the facility to make pesticides including DDT and toxaphene whose residues also contaminated the site.

Kerr-McGee closed the plant in 1978.

Since 2010, the site fronting the St. Johns River east of downtown, has been on the EPA Superfund program's National Priorities List.

In its draft cleanup plan, the agency proposed immobilization and isolation on site as the primary remediation method over most of the approximately 31 acres, plus an additional 2.5 acres of adjacent St. Johns River bottom.

The primary goals of the proposed treatment methodology are to prevent exposure of contaminants to humans and wildlife; to prevent further contamination of adjacent properties, particularly resulting from contaminant plumes moving through the aquifer; and to reduce contamination of groundwater sources to meet the criteria for drinking water sources.

The proposal endorses covering the site with a textile liner and clay layer to prevent stormwater seepage from carrying arsenic, lead and chlorinated organic compounds into the surficial aquifer or off-site to adjacent properties.

Clean topsoil will cover the clay and textile liner to encourage revegetation. In addition, a lined stormwater retention pond will be constructed to manage runoff. Preventing runoff from mobilizing contaminants addresses a major problem at the site.

Contaminated material from hot spots on the property will receive off-site treatment and disposal.

On-site hot spots include a former scrubber sludge pile and a surface impoundment.

The locations contain materials such as industrial sludge containing contaminants considered to be highly toxic or highly mobile.

Chemical contamination from the former plant has spread to adjacent properties. Those sites are also included in the proposed remediation effort.

In one case, runoff and groundwater plumes carried chlorinated organic compounds and arsenic to adjacent property owned by CSX. The plan proposes removal, treatment and disposal from the CSX property.

Subsurface water flow also carried substantial contamination into the St. Johns River. The river's sediments adjacent to the former plant site are contaminated to a depth of up to six feet by notably high concentrations of DDT, toxaphene and arsenic.

SUPERFUND
Continued on Page 16

FRC 2016 rescheduled

The 2016 Florida Remediation Conference—cancelled when Hurricane Matthew blew through in early October—has been rescheduled for Dec. 1-2.

Almost all of the original speakers are in place and the technical agenda is virtually identical.

If you registered to attend in October, please confirm your participation with an e-mail to mreast@enviro-net.com. If not, you can register at www.enviro-net.com.

For more information, call (407) 671-7777 or visit www.enviro-net.com.

Federal Clean Power Plan gets its day in court of appeals

Staff report

In late September, the U.S. Court of Appeals for the District of Columbia heard oral arguments in the Clean Power Plan case of West Virginia vs. the U.S. Environmental Protection Agency.

In addition to the state of West Virginia, 27 others including Florida—plus multiple companies and industry groups—are party to the suit.

The arguments focused on how much delegated authority Congress provided the EPA to draft this plan.

The EPA used Section 111(d) of the Clean Air Act to comply with a 2008 Supreme Court decision that carbon dioxide, because of its influence on climate change, is an air contaminant subject to EPA regulation.

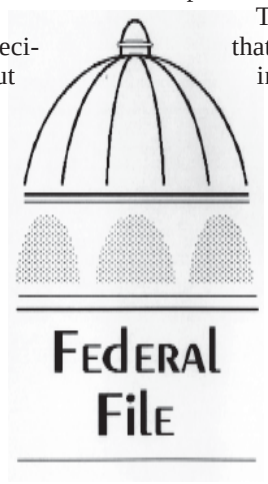
Past use of Section 111(d) has required industries to use the best commercially available technology to reduce emissions. Since no qualified technology exists to remove carbon dioxide, the EPA invoked 111(d) to require states to develop comprehensive plans to reduce CO2 emissions.

The federal requirement implied that states would have to shut down coal-fired plants, replace them with clean energy sources, and develop interstate cap and trade programs.

Any state that did not develop its own State Implementation Plan would be subject to one developed by the agency.

Opponents of the Clean Power Plan see this as overreach of delegated congressional authority by the EPA and misuse of the Clean Air Act.

The court could issue its decision by the end of the year. But that won't be the end of the challenges because it's virtually certain that plaintiffs will appeal any unfavorable decision to the Supreme Court.



Climate change threatens KSC. Even before Hurricane Matthew threatened to inundate the Kennedy Space Center, NASA's climate change risk assessments portrayed sea level rise as an increasingly serious obstacle to space exploration in the coming decades.

They report sea level rise as a middle term threat that will persistently raise groundwater levels, and potentially flood low-lying areas around launch pads, buildings and roads.

The occasional flooding threat from storms and ongoing coastal erosion along Cape Canaveral's dune may be even more damaging.

The report characterized these events in a scenario that seriously jeopardizes space exploration activities from Kennedy Space Center within a few decades.

The NASA study also indicated that the Johnson Research Center in Texas is threatened by sea level rise and hurricanes.

In addition, NASA's Ames Research Center in California's Silicon Valley faces environmental challenges due to drought.

Air pollution at ports. In late September, EPA released a report detailing a variety of strategies and technologies to reduce diesel particulates, sulfur emissions and greenhouse gases from vehicles, diesel-powered ships and other diesel engines in the nation's ports.

The goals are part of the agency's ports initiative.

The initiative has three goals: to reduce air pollution and greenhouse gas emissions, achieve environmental sustainability at ports, and improve air quality for Americans working in or living near the ports.

Over the past decade, international oceangoing shipping increased dramatically following industrialization and exponentially growing trade between Asia and the U.S.

Ports in the U.S. have been expanding on both Pacific and Atlantic coasts, hoping to get a share of the predicted shipping bonanza.

What had been regional air quality issues at a few of the nation's largest seaports may become much more widespread if ports nationwide expand as expected.

Until about 10 years ago, the U.S.' major ports, particularly those in California that are in enclosed basins or near large urban areas, were the ones that had the poorest air quality.

Over the last several years, the agency began offering grants to ports in poor air quality areas to develop and test technologies that lower diesel emissions.

In large part, the strategies endorsed in the EPA's port initiative arise from these locally-focused air quality improvement efforts.

The strategies include retiring older vehicles and equipment. Their replacement by cleaner technologies will reduce diesel emissions and, according to the EPA, has increased health benefits.

The EPA noted that replacing older drayage trucks with newer cleaner diesel trucks can reduce NOx emissions by up to 48 percent and particulate emissions by up to 62 percent by 2020.

Under international treaty, low sulfur fuel use is already required in the North American and U.S. Caribbean Sea emissions control areas. This has reduced sulfur emissions from ships using ports and traveling near U.S. coasts.

The recent initiative now focuses on port activities on American soil.

Refrigerant emission reduction rules. In late September, the EPA issued final rules to reduce projected growth and emissions of selected hydrofluorocarbons used as refrigerants.

The rules were issued under two different Clean Air Act sections.

Under the first rule, the EPA has designated alternative climate-friendly chemicals for use in refrigeration and air conditioning, as well as fire suppression.

Some of the substitutes are listed as unacceptable for specific uses in refrigeration and air conditioning.

The new rule also changes the status of a number of substitutes that were previously listed as acceptable in the refrigeration, air conditioning and foam-blowing sectors.

Foam products that contain unacceptable foam-blowing agents are also listed as unacceptable.

This action was taken under Section 612 of the Clean Air Act, EPA's Significant New Alternatives Policy, or SNAP, program.

Under the program, when the EPA lists one chemical as unacceptable or changes one's status from acceptable to unacceptable, the agency must determine that an acceptable alternative exhibiting lower environmental or human health risk exists.

The EPA expects the final rule to provide benefits equal to up to seven million metric tons of CO2 equivalents in 2025.

The second final rule strengthens refrigerant management program under Section 608 of the CAA. It extends the regulations to non-ozone depleting substitutes such as HCFCs and other substitutes.

The rule lowers greenhouse gas emission rates by lowering the refrigerant leak rate threshold requiring repair of large air conditioning and refrigeration equipment.

It incorporates industry best practices such as verifying repairs and conducting regular leak inspections. The EPA estimates that refrigerant emissions avoided

FEDFILE

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Naval Station Mayport implements energy efficiency, water conservation program

Staff report

A new energy efficiency and water conservation program at Naval Station Mayport in Jacksonville is expected to save the base about $600,000 a year.

Tampa-based TECO Inc. was awarded a $12.8 million contract by Naval Facilities Engineering Command Southeast for the project scheduled to be complete by November next year.

The project will upgrade interior and exterior lighting, expand the base's energy management and control system, and replace transformers to modernize heating, ventilation and cooling systems.

The changes are expected to save about 2,900,000 gallons of water a year.

Officials said that when the project is finished, facility managers will be able to better track and monitor energy consumption to get a more accurate idea of how and when energy is used.

Florida Notes

Carbon emission reduction potential. The Alliance for Industrial Efficiency has ranked Florida 11th in the nation for its potential to reduce carbon emissions.

The group said the state could save money by investing in industrial energy efficiency as part of its effort to comply with the federal Clean Power Plan.

Much of the savings could be made in the industrial sector, said the report, especially with the state's untapped solar potential.

According to the report, industrial energy efficiency upgrades could save manufacturers close to $300 billion on utility bills, while reducing as much carbon dioxide as closing 46 coal-fired power plants.

Alliance officials believe that Florida represents the largest untapped solar market in the country.

FPL solar. Florida Power & Light is looking at 684 acres straddling Alachua and Putnam counties for a massive photovoltaic solar facility.

They await approval from the Alachua County Planning Commission to proceed.

Over 300,000 solar panels would produce 74.5 megawatts of energy, enough to power 15,000 homes. The facility would function as a public utility, providing energy to its customers, and would create 200 construction jobs for a year.

Before proceeding further, Putnam County's Environmental Protection Department asked FPL to gather data on the potential link between solar panels and bird deaths.

Panhandle recyclables. Okaloosa County recyclables will now be sent to an Emerald Coast Utilities Authority facility in Escambia County.

Waste Management has been shipping Okaloosa's recyclables hundreds of miles from its transfer station to a facility in Marietta, GA.

ECUA opened a $10.6 million recycling plant in September that's capable of processing 40,000 tons of material annually.

Jim Reece, Okaloosa's recycling coordinator, said there is a new provision that requires any company working for the county to ship recyclable materials to ECUA.

Waste Management will be among the companies competing for the contract that has been put out for bid. Bids for prospective contractors are being accepted through November 10.

In the meantime, the county extended its contract with Waste Management for all residential services until March 31, 2017. A new contract will go into effect the next day.

Meanwhile, the county is finalizing an agreement between itself and ECUA.

Pinellas asset management. Pinellas County hired Woolpert to implement a $6.5 million software system.

The contract includes developing an asset management program, software installation and configuration, enterprise system development, and integration and deployment of the system to all divisions that manage county infrastructure assets.

The asset management program will align with internationally recognized standards established by the Institute of Asset Management and documented in ISO 55000.

Miami-Dade bans fracking. County commissioners recently passed an ordinance banning hydraulic fracturing in Miami-Dade County.

The ordinance noted that fracking could contaminate county water supplies, including the Biscayne Aquifer where many South Florida residents get their water.

Officials are also concerned that fracking pollutes air and soil, and increases seismic activity. They said that chemicals used in fracking are not well-regulated by the state of Florida or the federal government.

More than 80 Florida cities and counties have already banned fracking or expressed opposition to the practice.

People news. Peter Zeib, PhD, PG, LSP, was elected president and CEO of Geosyntec Consultants Inc. He succeeds Rudolph Bonaparte, PhD, PE, who served in the role for the past 20 years.

Zeib joined Geosyntec in 1999 and is now a senior principal hydrogeologist based in Massachusetts.

Lynn Spivey has been chosen as the new director of utilities for Plant City.

She has been employed by Arcadis Inc. as a principal engineer for the past 16 years.

Anton Post will take over the marine and environmental research division of Florida Atlantic University in early January.

He will take over for Megan Davis, who has been interim executive director since November 2013.

The 185 scientists, engineers, teachers and other professionals there do extensive research on the Indian River Lagoon.

Excess lead measured in Port Everglades buildings during routine sampling

Staff report

A high level of lead was found during routine water sampling conducted this summer in two buildings owned by the Port Everglades Authority.

Three water outlets had lead levels above the 15 parts per billion maximum contaminant level.

The contamination levels varied widely. The port's pubic works building had only 0.018 ppb. The Administration Building's fifth floor sampling location had 0.0565 ppb, nearly four times the federal standard, and the third floor had 0.0761 ppb, nearly five times the maximum contaminant level.

Water samples were then taken at taps and water outlets in these buildings and indicated a lead source in the plumbing or fixtures.

Port Everglades receives its drinking water from the city of Fort Lauderdale's system. That system's analyses indicate its water is not the source of the lead.

Port Everglades facilities have a history of elevated lead levels in drinking water that was thought to have been resolved several years ago.

In 2009, seven buildings showed water concentrations above the 15 ppb limit. The port established corrective procedures, including flushing service lines leading to cruise ships at the Port, a practice that eliminated excess lead.

Annual water analyses between June 2011 and June 2013 consistently showed lead below the 15 ppb threshold.

Under state rules, because lead was not found during the annual sampling following reduction efforts, the monitoring interval was extended from every year to every three years.

The recent sampling was the first required in the new interval.

In buildings of the same age as the port's, the source of lead in tap water is usually solder or alloys in the fixtures.

The authority plans to hire a consultant to make recommendations for lowering lead in its drinking water pipes.

In the meantime, they are replacing old plumbing fixtures and advising water users in the building to run the water about a half a minute before using it.

THE WATER WATCH

Deep injection in Broward. Waste Management is proposing to dispose of leachate from its Monarch Hill Landfill in Broward County by injecting it through a 2,000-foot-deep well into the Floridan Aquifer.

The company currently pipes the leachate to a county-owned deep injection well about a mile away. That well is one of 35 deep injection wells in Broward, most of them operated by municipalities or the county.

During a public hearing, the proposal ran into unexpected opposition when more than 100 Broward residents showed up to oppose the deep well.

The residents said that injection could contaminate the upper levels of the Floridan or Biscayne aquifers, both prominent sources of their drinking water supply.

Opponents also said the permit allows other agencies to truck in wastewater and dispose of it through the well.

Deep injection well opponents characterized the leachate as "garbage juice," a mixture tainted by unknown levels of toxins, radioactive materials, salts and other contaminants they do not care to have in their drinking water supply.

At the DEP public hearing, consultants hired by Waste Management said that if leachate were to migrate upward, it would be detected during routine sampling from monitoring wells at the landfill.

DEP could decide to hold another public meeting regarding the permit but as of mid-October, the department had not made a decision. In the absence of a second hearing, the next step would be a public notice from DEP of intent to permit.

Habitat, water quality funding. The U.S. Department of Agriculture's Natural Resources Conservation Service will spend $9,635,389 in Florida.

The funding aims to promote conservation practices on private land to improve water quality and coastal ecosystems.

The effort involves 70,410 acres of privately held land. The funding supports both financial and technical assistance for agricultural producers.

Specifically, it will encourage farmers and ranchers to use best management practices to reduce nutrient use and runoff, adopt no-till agricultural practices, plant cover crops and install grade stabilization and water control structures that reduce erosion of nutrient-laden runoff and improve water-use efficiency.

The USDA's Conservation Effects Assessment Project conducted modeling that estimated that combined efforts could prevent up to 117,000 tons of sediment from running off into coastal waterways and reduce runoff nutrients by one million pounds of nitrogen and 200,000 pounds of phosphorus.

The Florida effort is part of a $328 million restoration effort targeting priority areas in the Gulf of Mexico region.

Increased accuracy of water level measurements. In August, the Suwannee River Water Management District began using a new benchmark, the North American Vertical Datum of 1988, or NAVD88, as a standard for their water level measuring gauges.

It replaces the district's use of the National Geodetic Vertical Datum of 1929, NGVD29.

Recent technological advances, according to the district, support the use of the more accurate NAVD88 datum.

In practice, the values based on NAVD88 datum will range from 7 to 11 inches lower than those based on NGVD29 datam values.

Because NAVD88 is considered to be more accurate than the datum it replaces, comparison of water height across the district will be more accurate.

The district and U.S. Geological Survey collect surface water level measurements of the district's major rivers on a daily basis. Their immediate use is by the National Weather Service for flood forecasts.

In addition, the Florida Division of Emergency Management and the USGS also use the water level data. All will adopt the new NAVD88 datum.

Brevard wastewater expansion. Brevard County Government's Utility Services Department is expanding its South Central Regional Wastewater Treatment Facility in Viera.

The expansion will double the capacity of the existing wastewater treatment facility, which serves Viera, Suntree and a portion of West Cocoa. It provides both wastewater treatment and water reclamation..

The facility currently serves an estimated 28,500 residential connections and treats about six million gallons of wastewater daily.

Construction will double the plant's capacity to about 12 million gallons per day. Reuse water availability will also increase.

Ormond Beach offers reuse incentives. In late September, the Ormond Beach City Commission approved an incentive program that will encourage beachside residents south of Granada Boulevard to connect to its recently expanded reuse water system.

The incentive program affects 117 properties where reuse water pipelines were recently installed.

Owners of only seven properties have paid the connection and permit fees.

According to local reports, owners of nonconnecting properties prefer to wait until their irrigation systems need upgrading before paying the connection fee.

The city incentive program includes a waiver of that connection fee.

Homeowners connecting to the reuse water system in other neighborhoods typically pay $215 for the connection fee and $30 for the permit application fee.

Under the incentive program, the city will collect only the $30 permit application fee. The money lost by waiving the connection fee will be made up by a $16 monthly service charge to properties that take advantage of the fee waiver.

The city treats about 32 million gallons of wastewater weekly and produces about 27 million gallons of reuse water. The remaining five million gallons is released into the Halifax River.

Ormond Beach received a grant from the St. Johns River Water Management District earlier this year to pay one third of the cost of expanding the reuse system so that most of the remaining five million gallons currently discarded in the river can instead be used for irrigation.

Rescheduled FRC 2016 STILL Delivers More of Everything

More speakers and technical presentations, more exhibits and more networking opportunities than ever before *(in spite of Hurricane Matthew's best efforts)*

Dec. 1-2, 2016 • Rosen Centre Hotel • International Drive • Orlando

Technical Session Agenda

Day One, Thursday, Dec.1, 2016

Opening Session

9:00: **A Word from our Founder**
Nick Albergo, PE, DEE, Senior Engineer, GHD, Tampa

Keynote Address from the Conference Chair
Jim Langenbach, PE, BCEE, Sr. Principal, Geosyntec Consultants, Titusville

9:30: **Notes from the (Brown)Field: Limiting Consultant Exposure to Malpractice Risk at Contaminated Redevelopment Sites**
Michael Goldstein, Esq., Managing Partner
The Goldstein Environmental Law Firm PA, Miami

The dramatic expansion of the brownfields redevelopment marketplace is being driven by large, traditional developers who, even though historically risk averse, are increasingly forced to acquire contaminated sites as a result of a rapidly diminishing inventory of clean land in infill locations. While this creates more financial opportunity for environmental consultants, especially in Florida—one of the top brownfield markets in the country—it also carries significant malpractice risk for environmental professionals that are not familiar with the many ways in which development and construction activities at contaminated redevelopment sites can influence and alter traditional means and methods of conducting site investigations and cleanups. Michael Goldstein, one of the leading brownfield practitioners in the state and an environmental attorney for over 24 years, will analyze where specifically these malpractice risks exist, provide the legal basis for why they exist, present recommendations for minimizing such risk, and suggest strategies for converting such risk into a platform for creating new business opportunity. This presentation will specifically cover those assessment and remediation aspects of Chapter 62-780, Florida Administrative Code; Chapter 24, Miami-Dade County Code; and Chapter 27, Broward County Code, that most commonly impact and influence redevelopment activities at brownfield sites.

10:00 Break

Session 2: Sustained Release Technology Applications

10:30 **CSIA Evaluation of Slow Release Permanganant Cylinders**
Yi Wang, PhD, Director
Pace CSIA Center of Excellence, Pittsburgh, PA

A dual isotope technology based on compound-specific stable isotope analysis of carbon and hydrogen, 2D-CSIA, was recently developed to help identify sources and monitor in-situ degradation of the contaminant 1,4-dioxane in groundwater. Site investigation and optimized remediation have been the focus of thousands of CSIA applications completed for volatile organic contaminants worldwide. CSIA for the water miscible 1,4-D, however, has been technically challenging. The most commercially available sample preparation settings "purge and trap" for VOC, could not efficiently extract 1,4-D out of water for a reliable CSIA measurement, especially when the concentration is below 100 µg/L. Such a high reporting limit has prevented CSIA from being used for effective site investigation and remediation monitoring at most 1,4-D contaminated sites, where 1,4-D is often present at very low ppb levels. This presentation outlines the recent breakthrough in 2D-CSIA technology for 1,4-D in water, reported down to ~1 µg/L for carbon, and ~10-20 µg/L for hydrogen using solid-phase extraction based on EPA Method 522, and its benefit is highlighted through a case study at a 1,4-D contaminated site.

11:00 **Controlled Release Environmental Reactants – A Green and Sustainable Approach to In-Situ Remediation**
Lindsay Swearingen, PhD, Managing Partner, Specialty Earth Sciences, New Albany, IN

The environmental science community has an interest in identifying viable and sustainable remedial solutions for groundwater contaminant plumes that reduce carbon footprint, minimize waste generation, and limit energy inputs required for remediation implementation, operations and ongoing maintenance. DOE and DOD sites in particular could benefit from greener cleanup technologies, especially in light of future requirements to remediate vast dissolved phase plumes of emerging contaminants of concern such as 1,4-dioxane.

Sustained and controlled release reactant technology involves coating or encapsulating environmental reactant materials to facilitate more efficient and user-friendly in-situ remediation implementation. The result is a passive approach to ground water remediation that addresses the common challenges encountered with traditional liquid injection applications, such as contaminant rebound, plume migration and the need for multiple mobilizations. Rather than pressurized liquid injection, the energy of concentration gradient-driven diffusion as well as natural groundwater movement is used to deliver oxidants in the subsurface over long periods of time.

Sustained and controlled release reactant materials can be applied to the subsurface in a number of forms and methods. Multiple remediation practitioners have applied sustained and controlled-release reactants at sites across the U.S. and Canada. ESTCP Project ER-201324 is currently underway which is a slow-release chemical oxidant field demonstration for the remediation of 1,4-dioxane plumes. Site examples will be presented including site selection, implementation design, cost and monitoring data.

11:30 **Highly Successful ERD Pilot via Simple Additive Delivery System Lead to Full-Scale Biostimulation Strategy for Destruction of Residual cVOCs**
Kent Armstrong, President, TerraStryke Products LLC, Andover, NH

A former dry cleaner site experienced chlorinated volatile organic compound impacts to soil and groundwater. Contaminants-of-concern included tetrachloroethylene (PCE) and associated daughter products at concentrations above Ministry of Environmental & Climate Change Table 3 Site Condition Standards.

In October 2011, the consultant of record completed a pilot study evaluating the efficacy of TerraStryke® biostimulant ERDenhanced™ to enhance reductive dechlorination by native microbials under actual biogeochemical conditions.

The amendment was applied via passive release sock deployment units suspended vertically in saturated screened interval of existing two-inch groundwater monitoring well. Four replacement events were performed during evaluation, the last at week 20 of a 26-week evaluation. Baseline monitoring and sampling/analytical testing was performed prior to additive deployment. Four post-deployment performance monitoring/testing events were completed, the final event in week 26.

Pilot results confirmed rapid electron acceptor scavenging, expedited residual mass solubilization, and enhanced cVOC reductive dechlorination by native dehalorespiring bacteria. Specifically, PCE decreased 46.9% by week 8, increased 233.3% in week 14 (additive enhanced co-solvent effect), then decreased 89.6% in week-26. Total cVOCs decreased 49.6%, increased 282.6%, then decreased 77.4%. Parent/parent-daughter molar ratio decreased from 100% to 29.1%, a 70.9% reduction.

Monitoring/geochemical data provided a secondary line of evidence for enhanced reductive dechlorination.

In July 2013, MOECC approved a full-scale strategy combining source and ERDenhanced™ biostimulation. An injection gallery was installed in the excavation footprint. March and July 2014, 990kg and 840kg ERDenhanced™ was gravity fed into gallery using 1,100 liters make-up water. Five rounds of groundwater monitoring/sampling were completed between March 2014 and October 2015. 19-months post deployment, additive influence was observed at MW-2, MW-3, MW-6—15-20 meters downgradient of gallery. PCE decreased 99.9% at MW-2, 95.0% at MW-3, and 97.9% at MW-6. Total cVOC decreased 89.7% at MW-2, 75.8% at MW-3, and 88.1% at MW-6. Molar parent fractions realized were 99.0% at MW-2, 87.7% at MW-3), and 90.0% at MW-6.

12:00 **Day One Luncheon**
Luncheon Sponsor: **Advanced Environmental Laboratories**

Session 3: Combined Remedies for Enhanced Outcomes

1:00 **Large Diameter Auger Excavation and Enhanced Bioremediation using CHITOREM® at the former Dixie Cleaners in Jacksonville**
Jesse Brown, PE, Associate
Golder Associates Inc., Jacksonville, FL

The former Dixie Cleaners site is located at the north end of Lakeshore Plaza Shopping Center, northeast of the intersection of San Juan Avenue and Blanding Boulevard in Jacksonville, FL. The cleaners occupied the site from 1956 to 1995. Chlorinated solvents were released to the surficial groundwater underneath the dry cleaning building and through the sanitary sewer lift station. A groundwater plume consisting of high tetrachloroethene (PCE) and trichloroethene (TCE) concentrations extended over an area of approximately one acre. The most significant PCE impacts in soils and dense non-aqueous phase liquid were identified at a depth of approximately 18 feet below ground surface, following the contour of the stormwater drain along the northeast corner of the building. It appears that, historically, waste may have been disposed of outside the back door, where it then drained onto the asphalt and into a concrete culvert. The site lithology consists of silty fine grained sand from the surface to a depth of approximately 18 feet bgs, clayey fine grained sand from approximately 18 to 30 feet bgs, limestone from approximately 30 to 32 feet, and a stiff clay unit below 32 feet.

Previous remedial activities conducted at the site included the injection of Hydrogen Release Compound, HRC-X®, and Bio-Dechlor Inoculum. The initial HRC® and HRC-X® treatments were successful in achieving greater than 99 percent mass reduction in the shallow and the deep intervals. However, elevated PCE and TCE concentrations persisted in the intermediate interval located close to the sewer lift station. Golder used an edible oil carbon source, EOS®, below the building along with a shallow source removal to address this area. Golder also injected ammonium bicarbonate in 2006 to raise the pH of the intermediate aquifer. To address the increasing groundwater contaminant concentrations in the shallow and intermediate intervals, an additional injection of EOS® and AquaBupH™ was conducted in 2009. During the injection process an area of DNAPL was identified and further delineated in 2010 along the onsite storm drain at the back of the property. In 2011, Golder developed an interim source removal work plan to address the area of identified DNAPL upon available state funding.

To address the DNAPL source area present along the contour of the stormwater drain, Golder conducted a large diameter auger excavation in January 2016. A total of 18 LDA boreholes were drilled to depths ranging from 17 to 30 bgs. Each borehole was backfilled with flowable fill. Field screening using an organic vapor analyzer was used to assist in segregating excavated soils into roll-off containers for temporary storage. Composite soil samples were collected from each container and submitted to a laboratory for waste characterization purposes. Based on the lab results, a total of 345.19 tons of high level hazardous waste and 61.05 tons of low level hazardous waste was transported to U.S. Ecology's facility in Belleville, MI. A total of 125.15 tons of nonhazardous waste was transported to the Omni Waste facility in St. Cloud, FL.

Injection wells were constructed downgradient of the perimeter LDA boreholes. During their construction, a mixture of gravel and approximately 330 pounds of CHITOREM® was placed around the screened section of each well. CHITOREM® utilizes crushed crustacean shells as a carbon substrate that promotes anaerobic degradation. Following the LDA source removal, the storm drain was replaced and the site was restored to match pre-construction conditions.

1:25 **A Combined Remedy Approach to Address a Trichloroethene Source Zone at a Legacy Hydraulic Containment Site**
Joseph Bartlett, EI, Env. Engineer, Geosyntec Consultants, Titusville

Historic releases of trichloroethene, TCE, resulted in the contamination of the surficial aquifer at the Precision Fabricating & Cleaning Co. site in Cocoa, FL. Detailed investigations revealed the presence of onsite source areas and an associated downgradient dissolved plume. Remedial measures implemented at the site in 2002 included a hydraulic containment system to provide flux control at the PFC property line with downgradient dissolved plume monitoring.

After successfully operating and optimizing the system for over a decade, a combined remedies approach, which included an enhanced in-situ bioremediation strategy used in conjunction with the existing hydraulic containment system, was prepared with the goal of reducing the onsite TCE source zone and facilitating the accelerated shutdown of the hydraulic containment system.

The bioremediation design was implemented in October 2015 and included injection of Terra System's SRS-FRL® slow release electron donor and SiREM Laboratories KB-1®

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dechlorinating bacteria in the vicinity of a known release area which had been historically investigated by University of Guelph researchers. Immediately prior to injection activities the hydraulic containment system was shut down. Following an initial five-day shut-down period, the extraction system was restarted and operated for a three-day period with an objective of enhancing electron donor and microbial culture transport and distribution within the treatment area and toward the downgradient recovery wells. Following the transport period, the system was shut down for three months to promote biological degradation processes. The system was then restarted following this period in order to maintain hydraulic containment capabilities.

The combined remedy approach, utilizing the existing hydraulic containment system in conjunction with the focused bioremediation source zone reduction, has proven to be successful in documenting significant ongoing mass reductions. The presentation will provide up-to-date performance monitoring results associated with remedy implementation in addition to strategies and considerations for optimizing existing treatment trains using combined remedy approaches.

1:50 **Combining Adsorption and Bioremediation Technologies for In-Situ Groundwater Remediation**
Gary Birk, Managing Partner, Tersus Environmental, Wake Forest, NC

Laboratory studies have shown the potential to treat groundwater in situ by using a mixture of activated carbon, aluminum hydroxide and kaolin clay. This combination of materials can immobilize a range of amphoteric metals and organics, including petroleum hydrocarbon constituents. Combining this formulation with an appropriate mixture of amendments should minimize interventions by incorporating both adsorption and biostimulation techniques to manage groundwater plumes and destroy constituents of concern. Current activities include assessing pilot scale effects and implementation effectiveness.

The presentation will include results and lessons learned from laboratory work and the latest field implementation experiences. This dual function approach, which immediately binds contaminants and provides electron acceptors and micronutrients for biodegradation of organics, may provide both short term risk management and a remediation method for contaminated groundwater.

2:15 **Successfully Integrating Surfactants into ChemOx Technologies**
Dan Socci, CEO, EthicalChem, South Windsor, CT

Use of surfactants in remediation can significantly improve chemical oxidation results when optimally selected and applied based on site conditions. The idea of surfactant use in remediation however is often met with questions, uncertainty, and reluctance due to concerns of contaminant liberation and offsite contaminant mobilization. Drawing from experience optimizing and implementing surfactant enhanced in-situ technologies, Surfactant-enhanced In-Situ Chemical Oxidation® and Surfactant Enhanced Product Recovery™, with data points from a successful coal tar clean up in the New York City area and a petroleum LNAPL site in Texas as well as laboratory data, this presentation provides guidance on surfactant application, and addresses the most common concerns regarding this remedial option while also presenting its advantages. Information will be presented based on site experience as well as laboratory data that addresses many frequently asked questions about surfactant use with oxidants in remediation. Case studies will be presented, demonstrating S-ISCO remedies can achieve complete or near complete contamination removal, eliminating rebound and the need for follow-up treatments.

2:40 **A Multi-Site Performance Review of Slow Release Electron Donor and Bioaugmentation Co-Application Strategy**
Steven Sittler, PG, Senior Project Mgr., KERAMIDA Inc, Indianapolis, IN

This presentation will include performance data and cost analysis from multiple commercial sites throughout Indiana in which an electron donor and bioaugmentation co-application strategy was successfully implemented. As part of the multi-site review, a discussion on the consistent strategy for success which was implemented at these sites will be shared with the audience. Site challenges, conceptual site model development, baseline analysis and design and implementation of this electron donor/bioaugmentation co-application strategy will be discussed in detail. Site specific comparisons between the co-application strategy and separate injections will be presented. In a few examples, a combined remedies approach involving in-situ chemical oxidation followed by the electron donor/bioaugmentation strategy will be highlighted as well.

In recent years, technological advancements have allowed for a transition towards a co-application of controlled-release electron donors and bioaugmentation cultures of dehalococcoides, DHC. These advancements, such as pH neutral electron donors and a better understanding of the viability of DHC in this environment have allowed many to move away from the old way of thinking of waiting to bioagument. The result is a more aggressive approach with a significant increase in enhanced reductive dechlorination rates. Data suggests that this co-application approach can rapidly reduce PCE/TCE concentrations in groundwater followed by short-term increases in daughter products—cis-1, 2-dichloroethene, trans-1, 2-dichloroethene, and vinyl chloride. Sustained reductive dechlorination as a result of the slow release electron donor along with the increased degradation rates afforded by direct injection of a microbial culture are leading to complete degradation of the target constituents, thereby facilitating closure following the post-injection monitoring period.

The rapid success of this strategy will be highlighted in multiple data sets showing complete PCE/TCE reduction within three to 12 months with daughter products persisting for three to six months in most cases. Long term performance data showing sustained reduction of daughter products will also be presented. A lessons learned section will also be presented in which the need for small focused, supplemental injections was implemented quickly to minimize the time to cleanup goal attainment and avoid unnecessary monitoring. In conclusion, a comprehensive cost analysis with comparison to other traditional remediation technologies will be presented.

3:05 **Combining Technologies to Reach Site Closure**
Mark Kluger, President, Dajak, Wilmington, DE

Electrical resistance heating is a well-established, robust and rapid remediation technology. Primarily due to cost considerations, remediation practitioners generally apply ERH in the source zone to volatilize and treat volatile organic compounds. As ERH can maintain fairly uniform temperatures in the subsurface and as elevated temperatures increase reaction rates, there has been significant interest in applying ERH at a reduced cost to provide a plume-wide solution.

Moderately increasing temperature, 20-30 degrees Celsius, the subsurface matrix will increase biotic and abiotic reaction rates and will increase the dissolution rates of sorbed contaminants and non-aqueous phase liquids, making them bio-available. Field results, as well as published research, elucidate the production of short-chain, volatile fatty acids from the naturally occurring organic, non-soluble carbon already distributed throughout the treatment volume. The newly formed, dissolved organic carbon provides electron donors, supporting the biodegradation of chlorinated volatile organic compounds. Further, elevated temperatures help create redox conditions appropriate for anaerobic biodegradation. Keeping temperatures below those that produce steam eliminates the need for vapor capture and treatment, substantially reducing costs.

This strategy is currently being applied at an EPA Superfund site and data will be presented along with the principals of heat enhanced plume attenuation.

3:30 Break

Concurrent Sessions

Session 4A: New for 2016 - "Speed Talks"
New Products and New Approaches to Product Delivery

4:00
1) **Electrokinetic Enhanced Bioremediation to Effectively Deliver Amendments to Low Permeability Materials at a Florida DNAPL Site**
Sandra Dworatzek, Senior Manager, SiREM, Guelph, ON, Canada
2) **Replaceable Treatment Cartridges for Groundwater Remediation**
W. Joseph Alexander, PG, Principal, Ai-Remedial Systems LLC, Chapel Hill, NC
3) **Materials and Methods to Address Contaminated Ground Water to Surface Water Interaction: Case studies of sites with petroleum, PCBs, DNAPLs and LNAPLs, chlorinated solvents, arsenic and other contaminants.**
John Collins, COO and General Manager, AquaBlok, Toledo, OH
4) **Overburden and Bedrock Remediation Using BOS 200® at Former Retail Petroleum Sites**
Mike Mazzarese, Senior Engineer, AST Environmental Inc., Golden, CO
5) **Jet Injection for Treating Clay and LImestone**
Drew Baird, PG, Senior Geologist, FRx Inc., Cincinnati, OH
6) **Using Klozur® KP (Potassium Persulfate) as an Extended Release Oxidant and Permeable Reactive Barrier**
Patrick Hicks, PhD, Technical Sales Manager, PeroxyChem, Philadelphia, PA
7) **Controlled Discrete Treatment Using Horizontal Well Systems Under Tanks, Roads, Utilities, Buildings and Non-Responsible Owner Properties**
Lance Robinson, PE, Principal Research and Design Eng., EN Rx Inc., Parrish, FL
8) **Horizontal Directional Drilling and Well Installation at Small Sites**
David Bardsley, PE, BD Manager, Directed Technologies Drilling, Bellefonte, PA

Session 4B: Petroleum Cleanup– When You Can't "Risk" it Away

4:00 **Multi-Phase Extraction with Enhanced Biostimulation Demonstrates Contaminant Reduction at Petroleum Site**
Matthew Crews, PE, Sr. Project Eng., Golder Associates Inc., Jacksonville

Multi-phase extraction with enhanced biostimulation using an oxygen injection system has been used to remediate a NAPL and dissolved-phase petroleum contaminant plume that has migrated offsite over 200 feet towards a residential area in Springer, NM. The MPE system was set to maximize NAPL recovery, minimize groundwater extraction and maintain the groundwater elevation during high vacuum MPE. The oxygen injection system is cycled to run concurrently with the MPE system, but within opposite areas of the site, such that oxygen has sufficient time to diffuse into the groundwater. Higher dissolved oxygen concentrations provide a concentration gradient to diffuse oxygen into small pore spaces. The result is the biodegradation of contaminant mass that would otherwise be unavailable for biodegradation or removal by extraction or volatilization methods. Because the resultant

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New research finds significant level of groundwater exchange between oceans, lands

By ROY LAUGHLIN

In a recent issue of *Science Magazine*, a research team proposed that submarine groundwater discharge, or SGD, is much more extensive along all continental U.S. coasts than previously thought and plays a significant role in contaminant transfer between land and ocean.

SGD refers to underground freshwater flows that enter the ocean beneath its surface and saltwater flows from the ocean to aquifers under dry land.

The researchers found that "unlike rivers, SGD is broadly distributed and relatively difficult to measure, especially at continental scales."

Going from the continental to the regional scale, precipitation that varies with climate and weather predominantly influences regional SGD patterns. Coastal drainage geometry is the primary factor creating strong local variability.

The experimental method used is based on a simple water budget analysis and "state-of-the-art continental-scale hydrography and climate data sets."

High resolution hydrographic datasets allowed the researchers to define freshwater SGD recharge zones and contributing areas.

The researchers also made estimates of recharge zones outside of stream catchments where water flows to the coast and for areas where streams were not present.

In contemporary jargon, this is a "big data" study because the researchers used computers to simultaneously massage several data sets, none of which included direct SGD measurements, for their analysis.

The team compared their data set analysis results with 18 local SGD estimates to validate their findings. They found the predicted SGD rates they modeled were consistently lower than local estimates based on direct measurements, with the discrepancy pattern showing no relationship to geology, climate, land-use or population density.

The researchers suggested that their apparent SGD underestimation in comparison with local estimates is attributable to underestimates of groundwater source contributions from upland catchments.

Their use of high resolution hydrography data sets creates a consistent bias towards underestimation.

At a continental scale, SGD occurs extensively along both U.S. coasts. Recharge areas for freshwater SGD comprise only 0.4 percent of the total area of the contiguous U.S.

Counterintuitively, that small proportion of total continental area drains more water than the continental interior on an aerial basis as a result of receiving more net precipitation.

On a regional basis, SGD modeling estimates display distinct differences. The researchers noted that the influence of climate is clearest along the West Coast from Southern California to Washington State.

Both net precipitation and SGD increased by 90 percent in tandem from south to north.

A comparison of east and west coasts shows that—more than precipitation—drainage length predominantly influences freshwater SGD.

"Net precipitation is similar in the Pacific Northwest and the Mid-Atlantic, but freshwater SGD rates are approximately 50 percent greater in the Pacific Northwest due to the abundance of long coastal drainage links in steep terrain," the report noted.

On a local scale, the data set analysis indicated strong heterogeneity in freshwater SGD rates. This reflects the variability in land area contributing to freshwater SGD along a given coastal segment. Local topography and locations of coastal rivers also influence it significantly.

As a result, variability over short coastal segments of 100 kilometers, for example, can be nearly as large as variability a continental scale.

More importantly, "because of this strong local variability, freshwater SGD measurements at a single site cannot be extrapolated to other nearby sites with high confidence." Human modifications to coastal drainage networks also impact patterns of freshwater SGD.

The researchers also estimated saltwater SGD. Their modeling indicated that it is much larger, perhaps as much as 400 percent larger than freshwater runoff.

Florida, Louisiana and the southern half of California are the areas with the largest regional extent of saltwater SGD identified by the research.

The length of coastal segments affected by saltwater SGD is similar to that where freshwater SGD occurs on the east and west coasts.

Converting the landscape to agriculture typically increases freshwater SGD flows. Landscape conversion to urban spaces typically diminishes freshwater SGD, as is the case in Southwest Florida, where stormwater canal diversions have reduced SGD by half.

Some of the contaminants that find their way from urban areas to SGD are emitted intentionally and unintentionally by human activities.

When urbanization destroys wetlands, contaminant contribution to SGD may increase due to the wetlands' diminished role as a filter of precipitation and runoff that feed SGD.

Even though freshwater SGD volume is small compared to runoff, the authors noted that it is often subject to contamination by human development and human activities within the watershed.

Though volumetrically small, freshwater SGD can carry large contaminant mass loads. The highly localized SGD discharge areas cause hot spots for contaminant discharge to marine waters, the authors noted.

Nutrient contributions, especially nitrogen, are one of the best characterized SGD contributors to poor water quality in nearshore ocean waters.

Cited studies reveal that freshwater SGD delivers up to 30 times more nitrogen to coastal waters than rivers in parts of the world.

Given the potential significant difference of this database analysis of freshwater SGD flow to the ocean, with a number of local estimates of it, natural resource managers are certainly likely to base remediation efforts on measurement rather than data massage.

However, given the extremely high spatial variability reported, the analysis method using hydrographic and precipitation data analysis is a valuable screening tool to focus measurement on the most critical locations.

Further refinement of either data or analysis could improve the utility of modeling in local areas such as Florida. This tool is likely to see wider use, especially in Florida.

Eau Gallie to be dredged

Staff report

The Florida Inland Navigation District is allocating funding through its cooperative assistance program for the dredging of muck from the Eau Gallie River.

The money raises the total FIND contribution to $3.9 million. Other funding partners include DEP, which is providing $20 million, and the city of Melbourne, which contributed $50,000 for the initial feasibility study.

The district and its partners expect to remove at least 625,000 cubic yards of muck from the main stem of the 3.9-mile-long river, as well as the southern branch of the river known as Elbow Creek.

The muck is a mix of fine-grained sediments, sand, clay and organic matter contained in untreated stormwater runoff that drains to canals and drains connected to the river. Muck deposits from stormwater runoff is a common problem throughout the lagoon.

Abandoned wood treatment plant proposed as state's next Superfund site

By ROY LAUGHLIN

The U.S. Environmental Protection Agency proposed to list the abandoned Post & Lumber Preserving Co. site near Quincy in Gadsden County as a federal Superfund site.

Since the late 1940s, the 18-acre site housed a lumber treatment facility that used arsenic, hexavalent chromium and pentachlorophenol as preservatives. The plant ceased treatment operations in 1990 and the property has been idle since.

The property has a long history of contamination and cleanup efforts. The Florida Department of Environmental Protection investigated the site in the mid-1990s, identifying arsenic, pentachlorophenol and its daughter products, and dioxin in soil and groundwater exceeding cleanup target levels.

In 1996, the site owners razed the treatment plant, removing up to 15,000 cubic yards of contaminated soil as well as sludge from a surface impoundment under a Resource Conservation and Recovery Act closure permit. They placed the material in a clay-lined pit with a synthetic cover.

Although RCRA allows the government to seek reimbursement for cleanup costs from responsible parties, the Post & Lumber Preserving Co. is listed as an inactive Florida corporation. The estate of James Gilbert is the owner.

In May, 1996, officials from EPA's Emergency Response and Removal Branch returned to the property to conduct excavation and treatment of additional soil with contaminant content exceeding the agency's emergency soil removal criteria.

They found that the waste pool had overflowed into a creek on the property. The creek flows into the Little River.

Local news reports said that DEP identified contaminated soil and sediments in the both creek and river.

In 1998, DEP completed a contamination assessment report that noted arsenic in the soil above levels acceptable for residential land use widespread across the site.

The same is true for pentachlorophenol at several locations.

Seven out of 10 samples from the site showed dioxin at levels slightly above 7 parts per billion, DEP's recommended allowable concentration for residential land.

The EPA has since confirmed additional soil contamination by wood treatment chemicals on adjacent properties on all four sides of the site. The surficial aquifer is also contaminated by PCP and arsenic.

The Floridan Aquifer below the site shows no evidence of contamination yet, but "the potential for contamination remains a concern," according to a DEP document.

Additional remediation efforts have been ongoing since 1998. To date, approximately 74,000 tons of contaminated soils have been removed from adjacent residential properties.

In addition, a berm was constructed around the site to reduce erosion and overflow carrying contaminants off site.

An estimated 19,000 cubic yards of off-site contaminated soils and wetland sediments at off-site properties remain to be treated. On-site, 77,000 cubic yards may also need to be treated or removed.

Due to the high costs of cleanup, DEP requested additional assistance from EPA through its Superfund program.

In late September, EPA officials conducted a public hearing in Quincy and opened a public comment period that ends in late November.

Subsequently, the EPA will make a decision whether or not to designate the wood treatment plant a Superfund site and include it on their National Priorities List.

DEP pursues enforcement actions on Collier County fracking site

By BLANCHE HARDY, PG

The Florida Department of Environmental Protection hired ALL Consulting Inc. to monitor the closing of Texas-based Dan A. Hughes Co.'s controversial oil well fracking site in Collier County.

The consultant found evidence that Hughes Co. workers illegally dumped more than 100 barrels of oil waste into the former site well.

"The department has sent Dan A. Hughes Co. a warning letter, which begins the state's formal enforcement process requiring them to meet with the department to provide additional information," said Lauren Engel, DEP's communications director.

"The department will use this information along with the ALL report to determine if Dan A. Hughes violated Florida law," she said. "If the department finds that Dan A. Hughes violated Florida law, we will hold them accountable by issuing aggressive sanctions and fines."

DEP's warning letter is a part of the department's investigation of Hughes' site operations.

It states that "ALL observed conditions (that) demonstrate possible violations of Chapters 377 and 403, Florida Statutes, and Chapters 62C-29, 62-520, and 62-528, Florida Administrative Code."

The waste oil was a fracking byproduct composed of oil, water and acidic chemicals.

"After years of working to hold Dan A. Hughes accountable for the unauthorized workover activity (fracking), DEP entered into a settlement agreement with the company in January 2016 that required it to surrender its permit, perform additional well integrity testing and plug and abandon the Collier-Hogan well, all under the supervision of DEP and the independent expert, ALL Consulting," said Engel.

"ALL Consulting concluded that it likely would have required pumping by Dan A. Hughes for the material to be present in this area of the well," she said. "Because DEP's rules specifically prohibit this type of activity, if proven true, it would be a direct violation of Florida law."

The Hughes Co. well has been a magnet for local government and environmental advocate consternation.

Collier County officials have aggressively pursued action against Dan A. Hughes Co. for their use of the unapproved "enhanced acid stimulation" fracking type procedure to complete a workover of the well at the site.

The well site is in close proximity to both the Everglades and Florida's primary and critical panther habitat.

Hughes ignored DEP's request not to perform the controversial procedure. The department subsequently filed suit asking for $100,000 in penalties in addition to withdrawing the permit and requiring the abandonment of the well.

The incident has become one of the driving forces in the approval of local government anti-fracking rules in Florida.

Hughes initiated fracking activities at the Collier site as early as 2013 and began defying DEP orders almost immediately.

The company refused to abide by a department order to cease initial fracking so the state could determine if environmental impact was occurring. They were subsequently fined.

Estimates indicate that Hughes Co. has paid roughly $1 million in fines and cleanup costs. The oil company has been monitoring groundwater for potential contamination as part of the initial agreement between Hughes and DEP.

The existing agreement between Hughes Co. and DEP has been modified to include actions to address the area where the dumped waste was found.

Corps denies Long Bar Pointe, Webster Creek mitigation bank permits

BY ROY LAUGHLIN

In September, the U.S. Army Corps of Engineers denied the permit for Long Bar Pointe Mitigation Bank in Manatee County.

In a letter, Donald Kinard, regulatory division chief, U.S. Army Corps of Engineers, Jacksonville, wrote that the mitigation bank failed to meet federal standards and that mangrove trimming requested in the permit would result in ecological loss.

He said that the project "does not have the potential to provide sufficient compensatory mitigation" to meet criteria to mitigate "unavoidable impacts to waters of the United States."

Kinard specifically pointed out the prospect of unacceptable effects from boat traffic originating in a proposed lagoon, commercial and residential development and adverse impacts on an oyster reef restoration area if a 100-foot-wide gap between the mitigation bank's two parcels became a navigation channel.

A day later, Long Bar Pointe LLC withdrew its permit to DEP, which had previously issued an intent to permit.

A week after that, the partnership submitted a second permit to DEP that seeks to preserve 110.5 acres of seagrass and 120.9 acres of mangroves. It includes plans to remove exotic and invasive species, and plant native species on 18 acres of wetlands and 9.6 acres of uplands.

Like the first permit submission, the plan includes a stipulation to trim mangroves on about 36 acres to a minimum 12-foot height.

In a project review last summer, both National Oceanic and Atmospheric Administration and U.S. Environmental Protection Agency reviewers unequivocally panned the idea of allowing mangrove trimming, characterizing it as unprecedented and not ecologically acceptable.

The second Long Bar Pointe mitigation bank permit app still requests 18.6 mitigation credits, the same number that were eventually allowed after a controversial DEP administrative review.

Those 18.6 permits are worth a minimum of $1.86 million and may be worth twice as much.

Webster Creek Mitigation Bank

In mid-September, the corps also rejected a mitigation bank permit for the Webster Creek Mitigation Bank in Mosquito Lagoon, Volusia County.

A letter signed by Kinard accepted and endorsed many of the criticisms leveled by local opponents of the proposed 315-acre bank.

Volusia County's Board of County Commissioners opposed the permit because much of the area within the proposed bank was public land owned by the Florida Board of Trustees of the Internal Improvement Trust Fund and about 28 of those acres were previously restored by the St. Johns River Water Management District under an existing easement.

Kinard noted that the Volusia County Property Appraiser listed only 147.89 acres of the proposed 315-acre bank as owned by the permit applicant.

Likewise, many property owners adjacent to Webster Creek claimed the planned boundaries of the mitigation bank encroached on property deeded to them.

The Florida Department of Environmental Protection is currently conducting a mean high water contour review to help settle conflicting public-private ownership claims.

Local activists opposed the use of hydroblasting to level drainage ditches dug for mosquito control decades ago because they said the blasting will release contaminants to the lagoon.

In its own review, the corps expressed "concerns regarding the potential for direct impacts of existing mangrove swamp, salt marsh and oyster reefs within the proposed mitigation bank which may result from the proposed mitigation activities."

"The corps has determined that the project as proposed, does not have the potential to provide sufficient compensatory mitigation to compensate for unavoidable impacts to waters of the United States," the corps wrote in its rejection letter.

Pasco officials identifying, mitigating sources of Hudson Beach pollution

By PRAKASH GANDHI

Pasco County officials said they are making strides in their efforts to clean up long-running contamination problems at Hudson Beach.

A 2009 study noted that the beach had been the subject of 153 state health advisories over the previous seven years. Last year, the beach was closed for ten weeks because of the pollution warnings.

Officials suspect everything from septic tanks to waste dumping by boaters. A 2009 study by Florida Design Consultants even attributed part of the problem to waste from local pets.

But officials said that resolving the issue would be expensive—it could cost as much as $12 million for extending centralized wastewater system service to homes currently served by septic tanks.

In 2009, the county started a water quality assessment study at Hudson Beach to identify the potential sources of elevated levels of fecal bacteria.

Phase 1 identified multiple potential sources including stormwater runoff, failing septic tanks and sewage discharges from vessels.

Phase 2 measured fecal indicator bacteria at locations within the watershed that surround Hudson Beach and determined hot spots with elevated fecal bacteria in the water that could potentially impact the beach.

Phase 3 involved developing a microbial source tracking study to determine the source of the bacteria, and identify specific remediation targets and potential best management practices that might be used to achieve load reductions goals.

"As of today, we have concluded the three phases of the project and have identified potential sources that contribute to the high concentrations of fecal bacteria that have been detected periodically at Hudson Beach," said Juanita Bernal Leon, technical specialist III in the county's stormwater management division.

During Phase 3, officials used drifters to track surface currents and circulation within and near the tidal canals close to the existing stormwater ponds, Leon said.

The studies used source tracking to determine what type of fecal matter was in the water and then followed with GPS devices to study water flows.

Officials focused on a wastewater line running parallel to the beach and the parking lot owned by a private utility serving more than 2,000 customers in Hudson.

The results of the microbial source tracking study strongly suggested that human sewage from underground wastewater lines is having the biggest impact on water quality at Hudson Beach.

This conclusion is further supported by the closeness of aging underground sewer lines to the beach area.

Last year's study recommended that the county replace the sand and fabric filters in the 26-year-old stormwater drainage ponds nearby, one of which collects runoff from a 1.33-acre drainage area that includes the parking lot and restrooms serving the beach's boat launch. The county is recommending that the underground sanitary sewer facilities be inspected.

Leon said repairs have been successfully completed after leaking pipes were identified in two manholes. Also, the lift station in the parking lot at Hudson Beach was retrofitted.

Clermont taps Lower Floridan as alternative drinking water supply

By BLANCHE HARDY, PG

The Central Florida city of Clermont provides more than 180 million gallons of drinking water from the Upper Floridan Aquifer to its customers each month.

Groundwater is withdrawn from eight wells throughout the city to supply the city's residents.

But population growth is now exceeding the Upper Floridan's capacity to sustain potable supply without damaging surface and groundwater dependent ecosystems and springs.

So the St. Johns River Water Management District is requiring water utilities to identify alternatives to the once casually requested Upper Floridan Aquifer groundwater withdrawal increases.

Clermont, Lake County and the other water-supplying municipalities within the county have been discussing alternative water supplies for a decade.

Clermont is now preparing to tap the Floridan Aquifer again—but not its upper level. The city has received $1 million from the district and $500,000 from the state to research the feasibility of withdrawing water from the Lower Floridan for supply.

"Utilizing the Lower Floridan will provide an alternative to the Upper Floridan, which is counted on to satisfy the water needs of a large portion of the area," said Doris Bloodsworth, Clermont's communications director.

Similar wells have been installed in Clay and Orange counties and in the city of Ocala.

"Groundwater withdrawals from the Lower Floridan , in lieu of the Upper Floridan, have the potential to benefit lakes, rivers, streams and wetlands that have a hydrologic connection to the Upper Floridan," said Danielle Spears, SJRWMD's public communications coordinator.

Clermont's City Council approved a $2,098,060 contract with A.C. Schultes of Florida Inc. for the proposed project earlier this year

The city has district approval to drill two wells between 1,500 and 1,600 feet deep into the Lower Floridan.

Water withdrawn from the Lower Floridan will be piped to Clermont's Sunburst Water Treatment Plant.

Grant funding from the district and state is being augmented through the city's water fund reserve.

The project started in late summer and is anticipated to be underway for several more months. Schultes is constructing and testing the two new potable water supply wells, the LFA Exploratory Test/Production Well and the Lower Floridan Test Production Well. Both are anticipated to yield 2,500 gallons per minute of water.

Clermont and Lake County realize alternative supplies and conservation measures beyond wells must be implemented as part of their water supply program.

The Lower Floridan may provide additional supply, but is connected to area springs and the Upper Floridan, and requires preservation adequate to protect those resources.

"Conservation is the main method of reducing your water footprint," said Bloodsworth.

The water management district requires water suppliers to implement measures to assure supplies remain viable.

"As part of its consumptive use permitting process, the district requires all permit holders to use water as efficiently as possible," said Spears. "Water supply utilities are required to implement conservation rate structures, perform water audits to ensure system efficiency and develop programs for the use of reclaimed water."

The city's conservation efforts include water audits, customer and employee water conservation education program, reclaimed water use and irrigation audits

FEDFILE

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by this new rule will be more than seven million metric tons of CO2 equivalents annually.

WRDA passed. On the final day of Congress' pre-election session, the U.S. House of Representatives passed the Water Resources Development Act by a vote of 399-25. The Senate followed suit, approving the measure by a 95-3 vote.

One of the largest Florida projects addressed is the Central Everglades Planning Project, a part of the Central Everglades Restoration Project.

Slated to receive $1.9 billion, it will identify and plan projects on land already in public ownership to allow more water to be directed south to the central Everglades, Everglades National Park and Florida Bay.

These water routes south will provide Everglades National Park and Biscayne Bay the necessary freshwater for environmental health and habitat restoration that has been restricted for decades.

In addition, it may reduce some of the freshwater releases to tidal waters in the southern Indian River Lagoon, and to those near Fort Myers on the Gulf Coast.

The funding will meet the federal government's obligations for a 50/50 payment agreement for Everglades restoration.

This year's WRDA also includes $322.7 million to deepen the main shipping channels at Port Everglades from 42 to 48 feet.

In addition, it authorizes $30.78 million for beach renourishment in Flagler County, the Flagler County Hurricane and Storm Damage Reduction Project.

The Flagler project will extend existing dunes in central Flagler Beach 2.6 miles to help protect State Road A1A.

The Picayune Strand Restoration Project is also authorized to receive $113 million of additional funding as part of the Everglades Restoration Program.

The additional funding is for new features and improvements to the original design. Congress approved $503 million in 2007 for this project.

Herbert Hoover Dike repairs. The U.S. Army Corps of Engineers finalized a key report that authorizes additional rehabilitation work on the Herbert Hoover Dike surrounding Lake Okeechobee.

The report, a four-year effort, characterized the findings of a risk assessment of the 143-mile earthen dike around the lake and developed alternatives for its rehabilitation.

The report outlined plans to install 35 more miles of cut-off walls between Belle Glade and Lakeport along the south and west portions of the dike.

Also included are plans to armor the embankment near the State Road 78 bridge and construct flood walls at two water control structures on the north side of the lake.

The estimated cost of the remaining work is $830 million. These projects are scheduled for completion in 2025.

As of the end of 2016, the corps has completed a 21-mile partial cut-off wall and has at least started work on the replacement of 19 water control structures.

Congress has appropriated $870 million since 2001 to complete this work. Total funding of the Herbert Hoover Dike is expected to be approximately $1.7 billion.

Funding for the planned rehabilitation is part of expected recurring corps funding by Congress for dam maintenance and repair, according to a corps spokesperson.

The corps reiterated in its announcement that the primary purpose of the Herbert Hoover Dike rehab is to ensure its structural integrity. That does not necessarily mean that Lake Okeechobee will be able to hold more water on a routine basis.

A corps spokesperson noted that they anticipate starting a study on changes to the regulation schedule that will ensure results are available by the time dike rehabilitation is complete.

Calendar

November

NOV. 1-3 – Conference: Clean Gulf, Tampa, FL. Produced by Access Intelligence. Contact Jill Dean at (713) 343-1880 or visit www.cleangulf.org.

NOV. 1-4 – Seminar: 2016 National Clean Water Law Seminar & Consent Decree Workshop, Kansas City, MO. Hosted by the National Association of Clean Water Agencies. Call 1-888-267-9505 of visit www.nacwa.org.

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

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

NOV. 2-4 – Course: 25th Annual ELI Eastern Boot Camp on Environmental Law, Washington, DC. Presented by the Environmental Law Institute. Visit www.eli.org.

NOV. 3 – Course: Asbestos Refresher: Contractor/ Supervisor, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 3-4 – Course: Sequencing Batch Reactor Operation, Make It Work For You, Crestview, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 5-6 – Exam: Backflow Prevention Recertification Exam, Bradenton, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

NOV. 7-8 – Exam: Backflow Prevention Recertification Exam, Altamonte Springs, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 7-11 – Course: Backflow Prevention Assembly Tester Training and Certification, West Palm Beach, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 8 – Course: Refresher Training 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.

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

NOV. 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.

NOV. 8-9 – Course: Initial Training 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.

NOV. 8-9 – Course: Refresher Training 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.

NOV. 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 or visit www.treeo.ufl.edu.

NOV. 8-10 – Course: Initial Training for Operators of Landfills and C&D Sites- 24 Hours, Gainesville, FL. Presented by University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 10 – Festival: FAWQC Fall Festival, Tampa, FL. Presented by the Florida Association for Water Quality Control. Contact Erin Kane at (813) 765-8269 or visit www.fawqc.com.

NOV. 11-19 – Course: Backflow Prevention Assembly Tester Training and Certification, Ft. Myers, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 13-17 – Conference: 2016 American Water Resources Association Annual Conference, Orlando, FL. Visit www.awra.org.

NOV. 14-18 – Course: Backflow Prevention Assembly Tester Training and Certification, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 15-18 – Review: Water Class C Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 15-18 – Review: Water Class C Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 16-18 – Conference: Small Business Conference, Atlanta, GA. Presented by the Society of American Military Engineers. Call (703) 924-2616 or visit http://s3.goeshow.com/same/business/2016/index.cfm

NOV. 17-18 – Exam: Backflow Prevention Recertification Exam, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 27 – DEC. 1 – Conference: Florida Section of the American Water Works Association 2016 Fall Conference: The Value of Water, Orlando, FL. Call (407) 957-8448 or visit www.fsawwa.org.

December

DEC. 1 – Course: Hazardous Waste Regulations for Generators, Orlando, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 1-2 – Exam: Backflow Prevention Recertification Exam, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 2 – Course: U.S. DOT Hazardous Waste Materials/Waste Transportation, Orlando, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

DEC. 3-4 – Exam: Backflow Prevention Recertification Exam, Bradenton, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 3-4 – Exam: Backflow Prevention Recertification Exam, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 5-6 – Exam: Backflow Prevention Recertification Exam, Altamonte Springs, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 6 – Course: Initial Training Course for Spotters at Landfills, C&D Sites and Transfer Stations-8 Hour, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 6 – Course: Refresher Training for Experienced Solid Waste Operators - 8 Hours, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 6-7 – Course: Refresher Training for Experienced Solid Waste Operators - 16 Hours , Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 6-7 – Course: Initial Training for Transfer Station Operators and Materials Recovery Facilities, 16 Hour – Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 6-8 – Course: Initial Training for Operators of Landfills and Waste Processing Facilities, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 6-8 – Course: Initial Training for Operators of Landfills and C&D Sites- 24 Hours, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 6-8 – Course: Refresher Training for Experienced Solid Waste Operators and Spotters - 4 Hours, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

DEC. 7-9 – Conference: Florida Stormwater Association Winter Conference, Palm Harbor, FL. Call 1-888-221-3124 or visit www.florida-stormwater.org.

DEC. 8 – Course: Introduction to Lift Station Maintenance, Jacksonville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

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

DEC. 10-18 – 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.

DEC. 16-17 – Exam: Backflow Prevention Recertification Exam, Venice, FL. Presented by the University of Florida TREEO Center. Call 352.392.9570 or visit: www.treeo.ufl.edu

January

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

JAN. 9-13 – 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.

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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.

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oxygen supply is greater than the total oxygen demand, this system creates the desired aerobic conditions for indigenous bacteria to break down hydrocarbons for a more efficient cleanup of the site.

After eight quarters of operation, approximately 54,000 pounds of petroleum contaminants have been removed, constituting approximately 97% of the mass in place Golder estimated prior to remedial action implementation. Enhanced biodegradation is estimated to account for approximately 53% of the total mass of hydrocarbons removed at the site to date. NAPL was effectively removed during the first six months of operation. Dissolved-phase contaminant concentrations have declined to levels near or below applicable cleanup target levels onsite and offsite, with the exception of residual contamination present below an active dispenser island.

4:20 **From Injection to In-Situ Soil Blending; Switching Application Technology Mid-Remediation**
Brantley Rudd, Vice President, Exo Tech Inc., Monroe, GA

Petroleum constituent contamination in groundwater was discovered at a state reimbursable site in Chatham County, GA, in 1995. Throughout the site history, a total of 12 monitoring wells were installed on site. Light non-aqueous phase liquid was discovered in only one well. The initial remedial approach was to perform an enhanced fluid recovery event to remove the free product and continue monitoring the remaining wells for free product. Following the extraction event, the LNAPL was removed and was not detected in the other wells. Exo Tech was contracted to reduce the dissolved BTEX that was present in four monitoring wells. Prior to the implementation of any remedial activities, the UST's were abandoned and removed from the site. The initial approach defined by Exo Tech consisted of installing 56 one-inch injection wells. Two subsequent injections would follow the installation of the wells. The first injection would consist of catalyzed hydrogen peroxide to desorb an LNAPL mass that was sorbed in the soil matrix. The second injection would consist of sodium persulfate to treat the dissolved phase over a longer period of time.

In February 2014, Exo Tech installed 56 injection wells. The injection wells were installed to an approximate depth of 15 feet bgs. During the installation of the injection wells, LNAPL was discovered in an area that has historically never exhibited LNAPL. It was determined to continue with the injection of CHP but to focus the efforts in the area of the LNAPL. Two consecutive injections of CHP occurred on-site. The CHP injections consisted of mixing a 7% solution and injecting it in the LNAPL area. After the second injection it appeared that there was more LNAPL sorbed in the soil matrix than anticipated. It was determined to evaluate our approach and find a more economical way to introduce the oxidant. With the amount of LNAPL that was assumed to be present and with the site availability, it was determined to perform in-situ blending to introduce the CHP. An area of approximately 1,950 square feet was delineated. This area covered the assumed LNAPL area and some areas of high dissolved. The blending was performed by first removing approximately five feet of overburden. After reaching the impacted zone, the iron activator was blended into the soils. While the iron was being introduced, the hydrogen peroxide was being prepared. The hydrogen peroxide was dissolved to an approximate ratio of 12.5% and pumped into the excavation where it was blended thoroughly until a complete homogenous mixture was achieved. Backfilling was performed concurrently and Exo Tech demobilized.

Following the CHP blending treatment, the site was allowed to rest and the groundwater was allowed to return to background elevation. Sampling events were performed on a quarterly basis. No presence of LNAPL was detected on site and a no further action was granted.

4:40 **Life Cycle Risk Management: A Strategic Approach for Focused LNAPL Remediation**
Manivannan Nagaiah, PE, Project Engineer, Langan, Fort Lauderdale

Remediation of light non-aqueous phase liquid to the "maximum extent practicable" at sites both large and small can often be associated with high costs and uncertain timelines. This presentation describes the application of a risk-based, strategic approach for focused LNAPL recovery at a 70-acre asphalt refinery in Savannah, GA. This approach is centered on the development of a robust conceptual site model and recoverability analysis through testing and evaluation of LNAPL transmissivity. Site-wide LNAPL accumulations resulting from historical releases exist in a complex geologic setting adjoining the Savannah River.

We initially developed an LNAPL conceptual site model based on prior activities and in consideration of existing and potential sources, pathways and receptors. Our evaluation of the LCSM identified data gaps to be addressed and led to implementation of LNAPL recoverability testing utilizing vacuum extraction and baildown test methods. We subsequently conducted pilot testing to further evaluate remedial technologies including multi-phase extraction and LNAPL skimming.

Based on the investigation and testing findings, we defined priority areas for remediation on a site-wide basis that align with the refinery goals and objectives. We developed a focused and phased recovery program that provides flexibility for remediation of LNAPL toward attainable end-points and is consistent with the Georgia Environmental Protection Division Voluntary Remediation Program.

The program's streamlined approach allows for continuing operations and site redevelopment as well as a significant savings to the refinery. The LNAPL recovery program is designed to provide flexibility, efficiency and responsiveness to address existing product, and to re-assess recovery needs based on delineation, monitoring, data evaluation and performance assessments. The recovery approaches were proposed using available infrastructure and off-the-shelf equipment and systems, resulting in cost savings.

The proposed five-year program has been approved by the Georgia EPD, and recovery implementation efforts are ongoing. In describing the program components, we will also present a brief overview of the ongoing investigation and site remediation activities.

5:00 **FRC Reception in Exhibit Hall**
Sponsored by **EN Rx Inc.**

Day Two, Friday, Dec. 2, 2016

Concurrent Sessions

Session 5A: Enhancing Your Foundation for Remedial Success

9:00 **Innovative Use of Technology at Former NAS Cecil Field, Jacksonville**
Kara F. Wimble, Project Manager EnSafe Inc., Jacksonville

EnSafe is conducting long-term monitoring at former NAS Cecil Field in Jacksonville and maximized multiple technological applications to optimize field and associated reporting activities. EnSafe's innovative use of technology minimized limitations on current property owners so they could further develop and manage the sites for reuse as an industrial park and aviation center.

We incorporated an innovative application of existing technology to setup a Microsoft Office365 SharePoint website for the geographically-dispersed Cecil Field Team to collaborate on documents and data, and managed field data by implementing ESRI's Collector for ArcGIS for use on smartphones and tablets to access geographical information system maps, collect data using electronic forms, and capture field photographs.

In addition, an application was created to automate the extraction of data from EQuIS to perform statistical analyses and trend graphing using customized macros within Microsoft Excel, reducing the labor effort by 90% over previous methods.

Finally, we introduced the Cecil Field web-based mapping tool originally built using ESRI's Flex Viewer and migrated to ESRI's new WebApp Builder for ArcGIS. This tool allowed non-GIS technical team members to present mapping information in real-time during team meetings to facilitate discussions and decision making.

The collective successes of the Cecil Field Partnering Team were recognized in 2014 by receiving the Fiscal Year 2013 Chief of Naval Operation, Secretary of Navy and Department of Defense Environmental Restoration Team Award, and in 2016 for the ACEC - Grand Award. EnSafe's innovative use of technology optimized the LTM program at former NAS Cecil Field in Jacksonville, FL, resulting in a cost savings of approximately $1M.

9:30 **DNAPL Source Area Delineation Using MIP and HPT Technology at Space Launch Complex 16, Cape Canaveral Air Force Station, Florida**
Timothy Jellett, Senior Scientist, HydroGeoLogic Inc., Orlando
John Langett, GS-12, DAF, Project Manager, Patrick Installation Support Team
Brad Jackson, PG, CHMM, U.S. Army Corps of Engineers, Mobile, AL

The ability of dense non-aqueous phase liquid to migrate vertically and laterally makes subsurface delineation challenging and costly. Use of membrane interface probe and hydraulic profile tool technologies can reduce an 18- to 24-month field investigation to approximately 3 to 4 months and provide three-dimensional imagery of the source area.

This approach was used successfully for Space Launch Complex 16 at Cape Canaveral Air Force Station, FL. SLC-16 is an inactive missile launch site. Prior groundwater

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Environmental Services

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investigations had identified a DNAPL source area with trichloroethene concentrations as high as 1,000,000 micrograms per liter 1,200 feet west of SLC-16 and SLC-19.

MIP and HPT methodologies provided real-time data, qualitative information on variations in contaminant concentrations throughout the source area, and 3D images of the source area. The 3D images facilitated placement of the confirmation samples needed to delineate the contamination to the target concentration of 10,000 ug/L TCE.

10:00 **Design Verification Program: Lessons Learned from Pre-Application Assessments at In-Situ Remediation Sites**
Chad Northington, Southeast District Technical Mgr., Regenesis, Tallahassee

This presentation will focus on pre-application design verification steps that directly improve existing design assumptions prior to field application. The goal of this program is to determine what "lower-cost" field-based methods might provide significant benefits into design and application method selection prior to in-situ application, thus resulting in improved remedial performance outcomes.

Over the past 20 years, application of remedial substrates has had an uneven track record in terms of performance. Generally speaking in-situ remedial performance is the result of multiple factors. This presentation will focus on the identification of aquifer characteristics that can be documented using traditional field methods and provide the most insight into the remedial design and application programs. Specifically this presentation will focus on those target treatment zone, TTZ, characteristics that directly affect application programs and ultimately remedial outcomes.

On most remediation sites, two of the more important TTZ characteristics are soil type and the positional relationship between the soil types. The deposition process of sediments has a critical bearing on COC mass storage and distribution as well as remedial reagent selection and application methods. To assist design and application teams, a set of routine pre-application "design verification" steps were developed and performed on select project sites. Using these steps to identify the relationship between COC mass storage and distribution units within TTZ has contributed to an overall improvement in application programs and is seen to be a key element in higher remedial success rates.

This presentation will discuss the use of a set of lower-cost traditional field-based logging techniques for remedial assessment that have been proven to provide information in design and application program prior to field mobilization. These steps were originally developed for in-house projects across the U.S. As part of this pre-application program, a series of design verification steps were performed to systematically identify TTZ characteristics that might either limit or enhance remedial performance. These characteristics often directly affect the application strategy and methods and, in some cases, remedial reagent selection. Included in these are the quantity of sand size particles present and the use of clear-water injection testing. This discussion will include a couple of case studies as well as data sets collected from over 30 sites across the US.

Understanding percentage of sand size particles present as well as the size sorting in the TTZ can drive application and performance results. As an example, consistent continuous core collection and use of soil particle settling tubes as part of the process of soil logging has assisted in better field accuracy in this area.

Monitoring aquifer response during pre-injection testing greatly increases the ability to predict a more accurate TTZ accommodation rate and volume. Monitoring aquifer response has provided valuable insight into TTZ limitations and improved the process of project infield adjustments.

Session 5B: Emerging Contaminants: Remediation of Perfluorinated Compounds

9:00 **Best Practices in Sample Collection, Sample Preparation, and Analysis of Polyflourinated Environmental Contaminants**
Tom Fitzpatrick, Business Dev. Manager, AXYS Analytical Services Inc.

9:30 **Treatment of Emerging Contaminants of Concern with Activated Ozone**
William Kerfoot, PhD, Principal, Kerfoot Technologies Inc., Mashpee, MA

Perfluorinated compounds, for example PFOS and PFOA, and 1,4-dioxane have become emerging contaminants of concern in groundwater and soil. Numerous states have begun to develop desired not-to-exceed levels for the compounds in groundwater supplies foremost, and soil levels secondarily. The purpose of this talk is to present the developing regulatory guidance, present a brief overview of ozone chemistry to treat both compounds, and site examples of treatment.

Perfluorinated compounds have found broad use in fire-fighting foams, are persistent in soils and groundwater and have bioaccumulated, particularly in fish. Treatment of the compounds are difficult because the strong carbon-fluorine bond creates a thermally stable compound requiring an oxidation potential above 2.9 volts for successful attack. Nanobubble ozone coated with hydrogen peroxide as a Perozone®3.0 solution readily attacks and decomposes the perfluorooctanates. In permeable sandy soils, the ozone gas and liquid peroxide can be delivered through separate tubes to be combined below ground in special stainless steel laminar Spargepoints® that form coated nanobubble emulsions that are injected outwards through capillary pores. Kinetics of the reaction will be discussed, including production of fluorides and sulfate.

The compound 1,4 dioxane has been found with chlorinated solvent spill areas. Being highly water soluble, the associated plume may be larger than the initial TCA or related chlorinated compound plume. Twelve states have developed groundwater and/or soil target levels or remediation goals for the compound. It can be treated in-situ, or in-line treatment can be added to pump and treat systems.

10:00 **Treatment of Perfluoroalkyl and Polyfluoroalkyl Substances in Groundwater**
Gary M. Birk, PE, Managing Partner, Tersus Environmental, Wake Forest, NC

Per- and polyfluoroalkyl substances are surfactants and polymers that are widely distributed across the higher trophic levels and are found in air, soil and groundwater at sites across the U.S. Surfactant applications used heavily in the military include aqueous film-forming foams used to extinguish fires involving highly flammable liquids. The toxicity, mobility and bioaccumulation potential of PFASs pose potential adverse effects for the environment and human health. They are persistent in the environment, among the strongest organic compounds and thus considered non-degradable.

Practitioners have difficulty remediating these compounds at a reasonable cost because PFAS tends to be highly soluble, does not favorably partition into the vapor phase, and does not adsorb well to granular activated carbon. To date, GAC has been the only technically feasible method to treat PFAS-aqueous media.

This talk will present a treatment train for ex-situ treatments of aqueous film-forming foam impacted water. In the pretreatment phase, PFASs are precipitated by metering the liquid surface active compound into a stirring tank. The amount of reagent can be adjusted to varying concentrations. The precipitation products are separated from the water as micro-flocks by simple processes such as sedimentation and filtration. The precipitants can be concentrated to a very high degree, which allows for very economical disposal as compared to GAC. Post-treatment of the remaining residual contaminants is performed by a downstream activated carbon and activated carbon/aluminum hydroxide/kaolin filter. Due to the significant reduction in the PFAS-contaminated water in the initial precipitation stage—up to 90%—the PFAS contaminant load reaching the absorbent filter is lowered, which leads to a significant extension of the absorbers lifetime, again significantly lowering operating costs.

The presentation will also provide results of the effectiveness of an activated carbon/aluminum hydroxide/Kaolin mixture to treat PFASs. Studies have concluded that the adsorptioncapacity of the mixture for the smaller chain fluorinated substances PFBA and PFBS is vastly superior to that of GAC. This is likely due to the presence of the noncarbon components within the mixture creating unique physical chemical interactions with the smaller chain PFAS compounds.

10:30 Break

Concurrent Sessions

Session 6A: Plume Management Using Carbon Injectables

11:00 **Multi-Site Performance Review of Liquid Activated Carbon for Groundwater Treatment**
Chad Northington, Southeast District Technical Mgr., Regenesis, Tallahassee, FL

There is growing interest in the use of carbon injectables to expedite groundwater cleanup through coupling contaminant destruction with sorption. While an appreciation of the theoretical benefits of this approach is widespread, so is a natural caution among experienced remediation practitioners, as is understandable with any new technology. Among questions related to effective practical application of the technology are concerns regarding subsurface distribution in the field, applicability in low-permeability or heterogeneous formations, and short and long term performance.

This presentation will examine evidence from the field exploring these and other concerns. Data will be drawn from more than 20 field applications, variously addressing chlorinated solvent and hydrocarbon impacted sites and encompassing a variety of geological settings within both the United States and Europe. Contaminants investigated range from chlorinated ethenes and ethanes to aromatic and aliphatic hydrocarbons and PAHs. Sites considered include legacy MNA sites, drycleaners, industrial sites, post-industrial development

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sites and gas stations. Field data will be presented describing performance against remediation goals, performance validation and also lessons learned with regard to material placement, site characterization and the importance of application-feasibility pre-testing.

11:30 **Activated Carbon: A Pilot Study and Full-Scale Application in South Carolina**
Jill Tribley, , Woodard & Curran, Pittsburgh, PA
A pilot study was conducted in two areas near the leading edge of a long, narrow chlorinated volatile organic compound plume located in south-central South Carolina. The pilot study included the application of an in-situ, liquid activated carbon solution that purports to accelerate biodegradation and shorten timeframes for achieving remedial objectives. The cVOC plume extends over 1,700 feet beyond its identified source. Approximately 80 percent of the contaminant mass is found in a Coastal Plain sediment aquifer that is comprised of a relatively low-permeability silt and very fine- grained sand. The impacted zone is present approximately 20 to 40 feet below ground surface. Both overlying and underlying zones are impacted to a lesser degree in the source area but unimpacted near the leading edge of the plume. A residential area is located less than 1,000 feet from the leading edge of the plume.

Enhanced biodegradation and monitored natural attenuation are effective, widely-used remediation tools, but the timeframe for treatment by these methods can be on the order of months to years. The results of a remedial alternatives evaluation recommended accelerated biodegradation using an innovative, in-situ LAC solution. The remediation agent consists of highly sorptive, micron scale activated carbon particles stabilized to transport widely through an aquifer upon injection. The stabilized colloids deposit on soil surfaces, forming a biomatrix that retains contaminants and accelerates their degradation.

Prior to implementing a full-scale remedial effort, two pilot studies were conducted to evaluate the effectiveness of the approach near monitoring wells with higher and lower total cVOC concentrations. The pilot-scale tests consisted of a remedy that coupled the LAC with a controlled release electron donor and bioaugmentation culture to promote enhanced reductive dechlorination. The performance monitoring phase indicated that total cVOC concentrations decreased by 91 percent at the high concentration well and by 100 percent in the lower concentration well.

Based on the positive results of the pilot tests, the technology was implemented as the long-term remedial solution for the site at the downgradient portion of the contaminant plume. The full-scale application involved injecting the LAC solution in three passive-diffusion barriers that transect the downgradient plume. Combined with ongoing source-reduction activities, this remedial alternative should effectively prevent the plume from migrating further downgradient, which has been a concern of both the state and federal regulatory agencies. The protective effects of the remedial approach theorized to last many years will be evaluated through ongoing performance and long term groundwater monitoring. Results from the first six months of performance monitoring will be available prior to the conference and will be presented.

Session 6B: Modern Iron Applications

11:00 **What Your Mother Never Told You About Iron**
John Haselow, PhD, PE, President, Redox Tech, Cary, NC
Ever since researchers at the University of Waterloo observed differences in halocarbon concentrations in cast iron wells, zero valent iron has been used extensively in the soil and groundwater remediation business. Most of the early applications of ZVI employed recycled granular cast iron in barrier walls. This type of iron is known as “regrind” iron. The regrind iron was typically coarse and around 200 to 500 micron. Some regrind material was also known to have trace amount of grease and cutting oils, but more recently regrind suppliers have installed wash processes to minimize the amount of undesirable organic material. As the ZVI technology matured, different materials were tested and deployed.

Atomized ZVI, which is typically made from virgin iron ore, emerged as a cost-effective alternative to regrind ZVI. Injection applicators favored the atomized ZVI for greater reactivity and consistency. Atomized ZVI is available in wide range of particle sizes, but typical mean particles sizes for injection are around 50 to 100 micron

The next advancement in ZVI was nano-scale ZVI which is known for its high reactivity, but unfortunately, also its high price. There has been some use of nano-scale ZVI but it has not gained widespread acceptance. BASF has been producing carbonyl iron powder (CIP) since 1925 but it has only recently been touted for its perceived ease of injection. Some vendors are recommending CIP for injection through well screens, where ZVI has typically be “fracked” or jetted into formations. CIP is known for its high purity and small particle sizes with a narrow distribution. CIP particles are typically in the 1 to 5 micron range.

North American Höganäs recently began providing a very high surface area ZVI with

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high surface area and hydrogen generation capacity. Despite development of ZVI technology over the past two decades, data did not exist on the relationship between surface area and hydrogen generation capacity as well as reaction rates with target contaminants. This presentation provides an overview of the evolution of ZVI technology as well as recent reactivity and hydrogen generation testing results.

11:30 **The Effect of Emulsified Zero Valent Iron on Trichloroethene in the Presence of Chlorofluorocarbon 113**

Les Porterfield, PE, Director of Florida Operations, TEA Inc., Santa Rosa Beach, FL

It has been widely reported that 1,1,2-trichloro-1,2,2-trifluoroethene, or CFC-113, in groundwater can be inhibitory to the anaerobic biodegradation of chlorinated ethenes. Emulsified Zero Valent Iron, EZVI, has been shown to be effective at degrading trichloroethene as dense nonaqueous phase liquids. A field evaluation was conducted on the effects of EZVI and other amendments on TCE degradation in the presence of CFC-113 in shallow groundwater.

The approach involved assessing post-remediation monitoring results from the implementation of a remediation injection scheme with multiple reagents that included EZVI for DNAPL treatment, vegetable oil and KB-1® bacteria culture as remediation amendments to enhance the biogeochemistry of the subsurface and accelerate the reductive dechlorination reactions. EZVI was injected to treat the residual DNAPL source in the subsurface; KB-1® bacteria culture was injected to bioaugment the existing dechlorinating bacteria, and vegetable oil was injected to provide additional carbon for the microbial populations. A detailed review of the groundwater monitoring system results was used to assess the effectiveness of the TCE treatment and to evaluate the potential inhibitory effects of CFC-113.

The results indicate that the inhibition of TCE dechlorination by CFC-113 when treated with EZVI in an anaerobic reductive environment did not occur. The EZVI treatment for the TCE DNAPL and the addition of the KB-1® bacteria culture was successful in treating the TCE with no perceived inhibition, and also resulted in the simultaneous reduction in CFC-113.

These results are being used in an ongoing laboratory treatability study with subsequent supporting field data using EZVI to remediate a DNAPL source, also containing free product levels of CFC-113, with KB-1® Plus culture capable of degrading CFC-113 and TCE. Results from the field application and laboratory evaluation will be presented and lessons learned discussed.

12:00 **Day Two Luncheon**

2016 FRC Charity Introduction: Second Harvest Food Bank of Central Florida
Luncheon Sponsor: **The Goldstein Environmental Law Firm**

Session 7: Regulatory Panel Discussion:

1:30 **Important Changes to Chapter 62.780, F.A.C., Status Report on the Contaminated Media Forum and Updates to the Petroleum Restoration Program**

Moderator: Joe Applegate, Geosyntec Consultants, Tallahassee

Panelists: Brian Dougherty, Program Administrator
Office of District and Business Support, DEP, Tallahassee
Steve Hilfiker, President, Environmental Risk Management Inc., Fort Myers
Wilbur Mayorga, PE, Division Chief, Miami-Dade County RER-DERM, Miami
Diane Pickett, PG, Administrator, Petroleum Restoration Program
DEP, Tallahassee
John Wright, PE, Assistant Chief Engineer, Petroleum Restoration Program,
DEP, Tallahassee

3:00 Break

Session 8: Management of Groundwater to Surface Water Discharges

3:30 **A Novel Approach to Assess and Quantify Mass Flux of Groundwater Discharge into Surface Water**

Paul Favara, PE, Global Practice Director, Vice President, CH2M, Gainesville, FL

Discharge of contaminated groundwater to surface water occurs at many project sites. Due to a lack of cost-effective tools and methods to quantify mass-flux, cleanup objectives for groundwater are typically very conservative resulting in unnecessary treatment costs. There is a need for more cost-effective tools to better assess the mass-flux of groundwater migrating into surface water boundaries and natural attenuation along the flow path of groundwater as it migrates through the groundwater transition zone. Over the past several years, a sediment-bed passive flux meter has been developed to provide cost effective and reliable mass-flux measurements.

The SBPFM builds off of the significant research on passive flux meters previously performed. The main design challenge in developing the SBPFM was converting the PFM, which measures horizontal flux in groundwater, to a vertical configuration to assess groundwater discharging through the groundwater transition zone into surface water. The SBPFM was designed to be capable of passively and directly measuring local contaminant and water fluxes and provide more accurate information on the temporal mass flux distribution through the sediments in order to better design site remedial and closure strategies. Once laboratory testing of the SBPFM was completed, the flux meter was deployed at several sites. The field deployments were designed to assess ease of deployment as well as information that could be used to determine how mass flux could be interpreted from the deployments.

This presentation will address the results of laboratory testing completed in designing the SBPFM, which led to the final configuration and field test results. The field deployments of the SBPFM showed that the flux meters could be easily deployed near shore and could provide results for both tidal and non-tidal waters. Additionally, it was found that both activated carbon and ion-exchange resins could be used to measure a broad range of contaminants. The deployment results demonstrate that higher quality flux measurements could be achieved since the SBPFM results represents an average flux over an approximate two-week period, as compared to "point-in-time" measurements typically used in the industry. An economic assessment of a flux meter deployment compared to other sophisticated sediment flux tools also demonstrate similar benefits and an approximate 50% cost savings.

4:00 **Angled Injection of BOS 100® to Mitigate PCE Intrusion into a Stream**

Mike Mazzarese, Senior Engineer, AST Environmental Inc., Golden, CO

BOS 100® was injected adjacent to and beneath a stream using a direct push angle drilling technique to successfully create a PRB and limit PCE flux from the upgradient source area into the stream.

The Superfund site is a former textiles facility where tetrachloroethylene was used in drycleaning operations. Approximately one-half mile downgradient of the source, PCE was discharging into a stream through the saprolitic formation. Based upon stream bank and bed soil sampling and groundwater modeling, it was determined that the PCE was upwelling into the stream from partially weathered rock as deep as 65 feet below ground surface. The project objective was to determine if a Trap and Treat® BOS 100® permeable reactive barrier could be effectively angle drilled in the wooded and sloped area on the upgradient side of the stream to intersect the plume and reduce or eliminate the contaminant mass flux into the stream.

In the source areas, reductions of 90% to 98% have been observed. The observations made at micro wells and stream bed piezometers demonstrate that effective distribution of the BOS 100® was achieved during the pilot test injections. The analytical data from 12 of 15 micro wells installed in the PRB displayed significant contaminant mass reductions following the pilot test. The eight streambed piezometers located directly downgradient of the PRB have exhibited decreases ranging from 88% to 100% and have illustrated time-trends consistent with the expected mechanics of a PRB. The full scale angled injection was implemented in the fall of 2015. Data from the pilot test and full scale will be presented.

4:30 **Column Studies for Design Optimization of Field Pilot and Full Scale Denitrifying Permeable Reactive Barriers**

Michael Lee, PhD, VP Research and Development, Terra Systems, Inc. Claymont, DE

Many of Florida's sensitive surface waters are impacted with nitrate from septic tank discharges and infiltration of urban and agricultural fertilizers. Sustainable technologies like permeable reactive barriers are being evaluated as non-traditional treatment alternatives for nitrate impacted groundwaters. Terra Systems Inc. has performed a column study to both evaluate the nitrate treatment capability of emulsified vegetable oil PRBs and determine critical PRB design parameters using nitrate-contaminated sandy soils and groundwater from a site on Cape Cod, MA.

The column study allowed for comparison of biological nitrate reduction effectiveness of different EVO formulations and EVO loadings. The columns were operated at groundwater flow rates of one foot per day which is representative of many areas in Florida.

The column study determined time to reach complete nitrate removal, removal mass and rate of primary and secondary contaminants, buffer requirements, initial radius of influence of the injected emulsion, and projected emulsion migration distance and rate. Complete nitrate reduction continued even as total organic carbon levels in column effluents fell to between 2.3 and 3.0 mg/L by day 298. Nitrate began to increase after about 340 days when TOC fell below 2 mg/L. The column study shows that EVO effectively stimulates naturally occurring denitrifying bacteria in septic tank-impacted soils and groundwater for sustained nitrate removal while providing multiple parameters for design optimization of field pilot and full scale EVO PRBs.

5:00 **Conference adjourns**

Photo courtesy of Clark Environmental

Clark Environmental again hosted the putting contest at the annual FRC charity golf tournament, raising hundreds of dollars for our 2016 charity, the Second Harvest Food Bank of Central Florida. Shown here, the championship caliber players comprising the Clark Environmental team visit the putting contest green hosted by Jim Clark and Brandy Skinner, Clark Environmental.

2016 FRC Charity Golf Tourney avoids the wrath of Matthew, comes off without a hitch

The 7th Annual FRC Charity Golf Tournament was blessed with beautiful weather the day before Hurricane Matthew skirted the Florida coast causing widespread flooding, wind damage and power failures on its way to the Carolinas.

In spite of the impending storm, well over 100 players and dozens of sponsors participated in the annual charity event, enjoying a day of fellowship while raising money for the FRC 2016 charity, the Second Harvest Food Bank of Central Florida.

Over $25,000 was raised at the event with an opportunity to reach close to $30K at the rescheduled FRC conference in early December through a Silent Auction, Drum of Cheer and other charity-related conference activities.

Orlando-based FECC Inc. was the Signature Sponsor for the 2016 FRC Charity Golf Tournament. Show above, Todd Hodgson, left, and Shane Billings, both with FECC, accept the committee's thanks for their support of the event.

Though the real winner was Second Harvest Food Bank, some good golf was also played.

Taking the first place trophies at 18 under par was the team sponsored by SGS Accutest: George Morrison, Jeff Peters, Brian Moore and Brian Shinall.

Second place was a tie with two teams ending the day at 16 under par:

- The team from The Disability Champions: Mike Reese, Rick Fleca, Shane Croft and Todd McClelland, and
- The team from U.S. Environmental Rental: Jarrod Polidari, Eric Morgan and John Spadea.

Lastly, this year's most honest foursome, ending the day in last place, was the team from DEMCO Inc.: TJ McNamara, Sean Callahan, Pat Callahan and Mike Spence.

Special thanks to FRC Charity Committee Chair Jim Cohen from Rainmaker Group Consulting and Co-Chair Jennifer Belmore with Carbon Service & Equipment Co.—as well as all of our 2016 committee members—for again producing an excellent event to benefit a worthy Florida-based charity.

Phosphorus levels from EAA ag operations achieve water quality targets

Staff report

Everglades Agricultural Area farms met stormwater runoff water quality requirements during the latest reporting year.

Specifically, phosphorus in runoff from the EAA was reduced by 51 metric tons, or 27 percent, across the EAA, compared to baseline phosphorus releases in 1995.

The Everglades Forever Act established the 25 percent reduction target for farmers in the EAA. Over the past 20 years, EAA farmers have averaged a 56 percent reduction in phosphorus releases.

In 2015, phosphorus in stormwater releases was reduced by 79 percent. The heavy El Niño rains during the winter of 2016 were responsible for cutting typical phosphorus retention in the EAA in half, according to South Florida Water Management District officials.

In announcing the nutrient release figures, the district noted that while typical January rainfall is about two inches across South Florida, more than nine inches fell in January 2016. That made it the wettest January in a quarter century.

During November, 2015, through January, 2016, the first half of South Florida's usual dry season, more rain fell than in any prior season dating back to 1932 when record-keeping began.

In mass terms, based on monitoring measurements, 51 metric tons of phosphorus was removed from EAA runoff sent to the Everglades through the SFWMD's system.

According to the district, since 1996, the use of BMP programs in the EAA has retained 3,055 metric tons of phosphorus, preventing its release in flows to the Everglades.

SPILL

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water could have made its way through the system to residents.

Bellia said water quality monitoring for volatile organic compounds and semi-volatiles in the water showed decreasing contamination with time.

She said follow-up sampling showed VOCs and semi-volatiles below detection limits, allowing the water treatment plant to resume withdrawals from the creek.

Additionally, she said that all contaminated soils have been removed.

The Florida Department of Health was the lead on surface water sampling.

The agency tested about 4.5 miles up river from the drinking water plant's intake. Analyses indicated that contaminants were under the detectable limit, said DEP Spokesperson Jessica Boyd.

Groundwater monitoring wells were installed on Oct. 3 to monitor for any long-term impacts.

SUPERFUND

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The EPA's plan proposes bulkheading about 2.5 acres of the river's shoreline and shallows to contain the sediments.

Small areas of contaminated sediment outside the perimeter of the proposed bulkhead will be dredged and moved inside the bulkhead for permanent isolation.

The bullheaded area will then be capped to prevent any migration of the contaminated sediments, or further contact with St. Johns River water.

After remediation efforts are complete, the plan proposes long-term surface water monitoring to verify that contaminants are staying on site. The monitoring program will focus on DDT, gamma chlordane, aluminum, copper, iron and mercury.

This site cleanup has a 35-year history. Initially, the Florida Department of Environmental Protection, characterized the pollution and attempted to get Kerr-McGee to clean it up after closure in 1978.

But when the magnitude of contamination became apparent, Kerr-McGee and its parent company, Anadarko Petroleum Corp., spun off this and other contaminated sites into a subsidiary, Tronox Inc.

Shortly thereafter, Tronox declared bankruptcy, citing the financial burden of cleaning up abandoned contaminated properties. EPA then took the Jacksonville site into its Superfund program.

This property had one of the highest site rankings of any in EPA's Region 4 due to its high levels of arsenic and chlorinated organic compounds in the soil and groundwater.

To return the property to a condition that allowed low risk use or redevelopment, remediation costs in the tens of millions of dollars would be required.

The Obama administration's Department of Justice sued and won the precedent-setting lawsuit against Anadarko. The 2014 settlement included an $80 million payment from the corporation to be used for remediation.

The newly proposed cleanup plan is expected to cost at least $69 million.

In late September, the EPA began public hearings in Jacksonville to garner public comment that may result in some refinement of the plan. The cleanup work could begin as soon as next year.

Robenson Joseph, remedial project manager for EPA Region 4, said there was no strong opposition to their plans.

"The usual feedback was generally speaking positive and supportive of what we've proposed," Joseph said.

Early in 2017, the EPA could hire contractors to design the remediation project, expected to take 12 to 18 months.

"In the grand scheme of things, we're looking at three to five years to complete the entire project," Joseph said.

This land is zoned for commercial and industrial development, he said. The expectation is that a remediation effort will support a new owner's plans for redevelopment.

"We are also trying to get someone to acquire the property," he said. "Should a buyer or buyers come forward in the next year or so while the remediation plan is still being designed, that plan would be tailored for compatibility with a new owner's intended redevelopment plan."

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