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October 2014

Volume 36, Number 9

Fort Pierce cleanup 5

Treatment efforts to cleanup soil contamination at the site of a former power plant in Fort Pierce are slowly moving forward. So far, more than \$2.6 million has been spent to cleanup the site.

PEER on enforcement 5

Public Employees for Environmental Responsibility released a report in September noting that pollution fines collected this year in Florida fell by 57 percent. The report followed news in August indicating that facilities with major wastewater discharges remain in violation of their Clean Water Act permits.

Everglades report 12

In a report prepared by the U.S. Army Corps of Engineers, Everglades water quality received a passing grade with samples showing a decline in phosphorus in the Everglades Agricultural Area.

Vero Beach pilot 14

Vero Beach officials are hoping to reduce the level of pollution entering the Indian River Lagoon by embarking on a project to divert septic tank wastewater to a modified combined Septic Tank Effluent Pump system.

IFAS drought tool 14

Scientists with UF's Institute of Food and Agricultural Sciences have created a decision support tool that can help lessen the impact of crop-destroying drought.

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Got a story lead?

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

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DEP annual report: State brownfield programs, number of BSRAs on the decline

By ROY LAUGHLIN

According to a new report, brownfield redevelopment programs and executed brownfield site rehabilitation agreements have declined significantly over the past year.

The numbers are laid out in the Florida Department of Environmental Protection's "Annual Report of the Florida Brownfields Redevelopment Program, July 2013 – June 2014."

The declines are part of a trend that began in 2012. But if the low numbers persist, this year may experience one of the largest declines since Florida's program began in 1997.

The concern is that the numbers may portend a continuing decrease in future brownfield redevelopment efforts by local governments.

So far in 2014, just four new designated brownfield areas were added to the state's total of 362 areas. The decline is in marked contrast to the prior four years.

Over that four-year period, the number of new designated brownfield areas per year was 25, 32, 33 and 26.

The highest number of brownfield areas designated per year occurred in

2008, when 61 sites were added to Florida's list.

In 2009, the total fell to 11, a decrease of 84 percent. 2014s numbers are on track to match it.

The number of brownfield site rehabilitation agreements executed per

year dropped substantially as well. Only three executed agreements occurred during the most recent fiscal year.

Since 2008, the number of executed

BROWNFIELDS
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Photo by Jesse Brown

Sites with petroleum contamination impacting surficial, intermediate and deep aquifers sometimes require the big guns—such as this site in Live Oak off Interstate 10. Golder Associates handled contaminant source removal using a large diameter auger, shown above, for the intermediate and deep impacts to a depth of 80 feet below land surface.

DEP to expand new water quality credit trading program statewide

By PRAKASH GANDHI

State environmental officials are set to expand a program that allows polluters to trade water quality credits—a voluntary, market-based approach to promote the protection and restoration of Florida's rivers, lakes, streams and estuaries.

Trading allows pollutant reductions to be environmentally valued in the form of credits. The credits are traded within a local market to promote cost-effective water quality improvements.

The result, according to state officials, is better water quality protection for less money.

The Florida Legislature passed a pilot trading program for the Lower St. Johns River in 2008 and authorized the Florida Department of Environmental Protection to establish requirements for trading in the restoration plan for the region.

Now, DEP plans to expand the program statewide to private property owners and farmers.

Late this summer, DEP hosted public workshops to discuss expanding the program.

One meeting was held in Palm Bay and another in Tallahassee. The workshops were aimed at soliciting input for the program before rolling it out statewide.

The trading concept is based on the fact that business and industry, wastewater treatment facilities, urban stormwater systems and agricultural sites that discharge the same pollutants into a waterbody may face substantially different costs to reduce those pollutants.

State environmental officials said the purpose of credit trading is not to

promote financial gains to some, rather to encourage a more effective, lower cost reduction of pollutants.

Financial savings will accrue to parties that buy credits from others for less than the cost of implementing the reductions themselves.

"Water quality credit trading is a voluntary, innovative, nationally recognized approach to achieve water quality goals more efficiently and is a tool that provides opportunities to expedite cleaner water," said DEP Spokesperson Dee Ann Miller.

2014 Conference Preview:

Trends in cleanup techniques, policy updates highlight FRC 2014

By ROY LAUGHLIN

The level of sophistication and complexity of technique seen with recent remediation work has far surpassed the dig-and-dump scenarios that characterized the industry's early years. Again this year, this trend is reflected in spades at the 20th Annual Florida Remediation Conference.

The majority of presentations this year deal with scenarios from project planning to site closure, including site characterization, treatment selection and order of use, sensing and analysis, data collection and equipment control through cybernetic feedback, and post-treatment monitoring to ensure risk reduction targets are achieved. Remediation is far more than a procedure now. It's all about scenarios.

Site assessment and characterization have never been more broadly appli-

State regulators want to foster regional cooperation by adding an economic incentive for water cleanup.

During the pilot test for the program, the city of Jacksonville was the credit buyer and private utility company JEA was the seller. Regulators had required both to reduce their pollutant loading to the river, but JEA had gone above and beyond its obligation.

The city bought credits from JEA,

TRADING
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cable, affordable or reliably useful. For example, Chad Northington, PE, a senior engineer with WRS Infrastructure & Environment in Tallahassee, will describe site assessment of a contaminant plume that "did not lend itself to one remedy."

Northington said that sophisticated assessments contribute to the goal "of getting something useful done while

FRC 2014
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Correction

In our September 2014 issue, a Water Watch brief incorrectly identified some of the cost of upgrades made to a sprayfield as being provided by Lake County. We should have referenced Lake City. Sorry about any confusion.

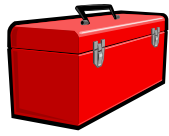
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EPA scientific advisory group urges stricter ozone standards

Staff report

An independent U.S. Environmental Protection Agency scientific advisory committee concluded that the agency should tighten its ground-level ozone standards between 7 and 20 percent to better protect human health and the environment.

The panel recommended a new standard between 60 and 70 parts per billion. EPA staff agreed with the report's findings.

Whether scientific consensus and support from EPA staff will result in a new rule remains to be seen. The current ozone standard, 75 ppb, has been in place since 2008.

In 2010–2011, the EPA conducted rulemaking to the point of proposing a rule to lower the ozone standard to 70 parts per billion. However, strong industry criticism and congressional opposition forced the withdrawal of that proposed rule.

The Clean Air Act requires the EPA to review, and update if necessary, air quality rules every five years. That rule and

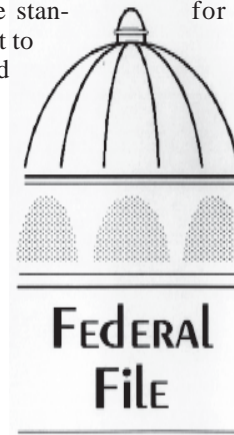
the settlement of a lawsuit bought by environmental advocates require the agency to have a new ozone standard set by December.

Scientific studies and background work for rulemaking have consistently shown that the current standard fails to adequately protect human health with substantial costs to individuals and the economy.

In 2011, opponents characterized the proposed standard as the most expensive environmental legislation ever passed. In contrast to the EPA's estimate of \$90 billion annually for compliance costs, industry estimated \$270 billion per year.

The economy is no longer in the depths of a depression as it was in September, 2011,

so perhaps it will not be withdrawn again. But with just weeks left before the midterm elections, this rule will likely be yet another issue whose fate will be decided well after the first Tuesday of November.



Coral species listed as threatened.

The National Oceanic and Atmospheric Administration added 20 species of hard coral to its threatened species list.

The 20 named species joined two Caribbean hard coral species, elkhorn and staghorn coral, already on the endangered species list.

NOAA characterized its final decision as "a result of the most extensive rulemaking ever undertaken by NOAA."

This rule has a two-year history. It was first proposed in 2012.

The EPA noted that over the past two years, additional research results and scientific information about the role of climate change and habitat destruction substantially influenced its decision for listing the 20 additional hard coral species as endangered.

Five of the additional species are Caribbean corals. The remaining 15 are Indo Pacific corals.

NOAA has not proposed specific rules to protect any of the newly listed species. The agency said that tools "available under the Endangered Species Act are sufficiently flexible so that they can be used for partnerships with coastal jurisdictions in a manner that will allow activity to move forward in a way that does not jeopardize listed coral."

The agency did identify threats to coral ecosystems and characterized some as the most serious. These are impacts related to climate change: rising ocean temperatures, ocean acidification and disease, ecological effects of fishing and poor land-use practices.

Urban air toxics reduction. In a recent report, EPA noted that substantial progress has been made toward reducing urban air contamination under the Clean Air Act Amendment of 1990.

An 84 percent reduction in airborne lead heads the list. In addition, benzene emissions have been reduced by 66 percent and mercury emissions by 60 percent.

Reductions in emissions from coal burning power plants and cement kilns are the primary contributors to lower mercury emissions to air.

Hazardous air pollutant emissions including arsenic, benzene, lead and nickel from stationary sources dropped by 1.5 million tons per year. Mobile sources of HAP dropped by that same amount, representing a 50 percent reduction from 1990 levels.

The EPA reported the results in the Second Integrated Urban Air Toxics Report to Congress. This is the second of two reports that EPA must submit to Congress under the Clean Air Act. It informs Congress of the agency's progress in reducing public health risks from urban air toxics.

FEDFILE
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Jacksonville officials wrestle with cleanup plans for park

Staff report

The state informed the city of Jacksonville this summer that more work is needed to clean up contaminated soil at Confederate Park near downtown.

Officials from the Florida Department of Environmental Protection said that a protective underground wall will have to be constructed and buildings that were constructed on top of long-forgotten contamination will have to be demolished.

A small building off Main Street downtown will have to be torn down without damaging two others that the city declared landmarks this year.

Other work includes digging up parts of the park on Springfield's southern edge and scooping sediment out of a pond there and along nearby Hogans Creek.

Chemicals from coal tar used at a plant that manufactured natural gas have seeped into groundwater for decades at Hogans Creek.

The cleanup would demolish one of the three buildings at 937 North Main Street.

The state reviewed three cleanup options the city offered earlier this year and approved two of them. The city must have its final cleanup plan ready by November, though officials said it will be difficult to meet that deadline as they do not yet have anyone under contract to prepare the cleanup plan.

Cleanup options include creating a sub-surface wall over 2,000 feet long that would block the groundwater flow moving through a zone of contaminated soil.

The wall would reach 40 feet below the surface and the soil would either be excavated and transported to a landfill or mixed with a cement-like material that would solidify the contamination in place.

The full cost for cleanup is expected to be over \$17 million.

In 2012, the city sued neighboring property owners in federal court, claiming they hadn't done anything to solve the problem that was partly their responsibility.

At one point, the state had recommended asking the U.S. Environmental Protection Agency to take over the cleanup as a federal Superfund project, but later backed off the idea.

Pensacola Superfund. According to EPA, there is still contamination at the former Escambia Treating Co. Superfund site in Pensacola.

The agency said that although soil contamination has been addressed to the point where it no longer directly threatens people living and working near the site, there is still contamination in the area's soil and groundwater that could potentially harm people in the future.

Among the contaminants still found on the property are creosote, PCP and dioxin. Additional cleanup is planned, depending on the availability of funding.

The agency said that the best case scenario is for the next round of work to start sometime in 2016.

Duke solar. Pinellas County has offered an old landfill site to Duke Energy for possible use as a solar energy farm.

The site is located between Ulmerton Road and 119th Street, abutting the Pinellas County Heritage Village in Largo.

Duke is also considering other locations in its Orlando and North Florida service areas.

Duke's community solar program is part of a proposal being considered by the Florida Public Service Commission.

The PSC recently approved a program by Florida Power & Light for limited solar power based on customer donations.

If a solar facility is built by Duke, the costs would be passed along to subscribers who want to use renewable power.

The utility has also submitted a detailed application with the Florida Department of Environmental Protection for its new Citrus County power plant.

In May, Duke announced it intended to build a natural gas plant there and shut down two existing coal-fired generating

units. The utility company must go through the state's site approval process.

Filed Aug. 1 with DEP, the application was sent to the state Division of Administrative Hearings. If approved, the plant would be built on 400 acres near Duke's long-standing Crystal River Energy Complex.

Construction of the plant would start in early 2016 and it would be producing electricity as early as 2018.

Gulf Power lawsuit. Attorneys for Gulf Power Company have asked a judge to dismiss a lawsuit alleging that the company is allowing pollutants from aging coal ash pits to leak into the Apalachicola River.

Earthjustice filed the suit in Tallahassee federal court this summer on behalf of three environmental groups who claim Gulf Power is illegally discharging arsenic, lead and other pollutants from its coal-fired plant into the river.

Representatives from Gulf Power said that numerous studies confirm that discharges from the facility are not adversely impacting surface water quality in the river.

The Jackson County plant that opened in 1953 is set to close next year.

South Miami waste. The South Miami City Commission unanimously rejected a proposed ordinance that would have privatized their solid waste department.

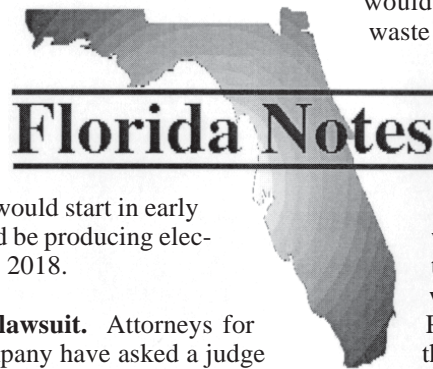
In all, 11 jobs within the city's public works department would have been affected had the proposal passed.


The city conducted a workshop in August at which their financial experts met with representatives of Waste Pro of Florida Inc. to discuss the proposed privatization plan in depth.

City Manager Steven Alexander and his staff worked on the plan that would have saved the city more than \$600,000 annually.

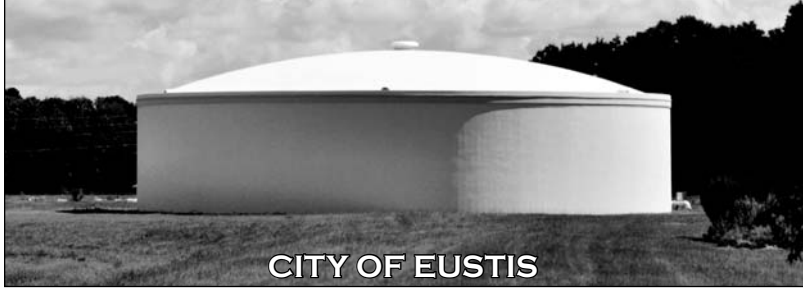
Indian River dump site cleaned. A property on 45th Street in Gifford has finally been cleared of 7,000 discarded tires and 250,000 pounds of debris and hazard-

NOTES
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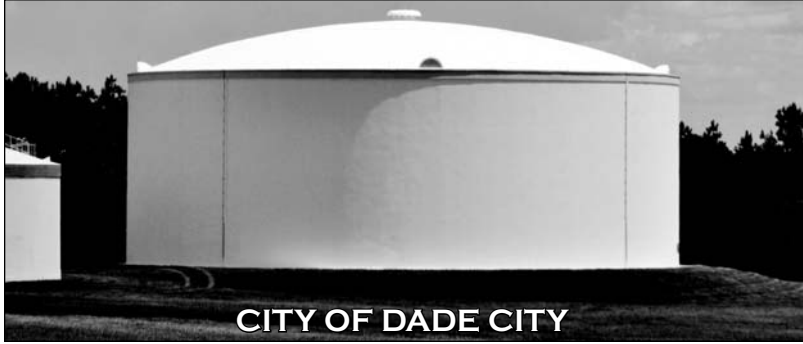
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DEP announces funding for spring improvement program across state

Staff report

Florida Department of Environmental Protection officials announced plans to spend almost \$70 million to improve the ecological conditions of more than a dozen springs across Florida.

The primary goal will be to improve water quality and quantity in 14 selected springs. Among the springs to receive funding are Wekiva, Ecofina, Homes Creek, Lake Panasoffkee Silver, Rock, Ichetucknee, Rainbow and Jackson Blue, among others.

Specific details of the 27 projects re-

main sketchy.

Each spring system has its own circumstances to be addressed, and the restoration effort for each will be influenced by the level of matching funds available from the regional water management districts and local governments.

Port Everglades dredging. Port Everglades' entry channel and basin may be dredged to 48 feet, one foot deeper than the U.S. Army Corps of Engineers recommends.

To get the extra foot of depth, local agencies will have to fund about \$18 mil-

lion of the \$370 million project.

After 18 years of planning, the corps said it will recommend that the channel be dredged to 47 feet.

The deepening project will destroy many acres of coral reefs and, according to the corps' analysis, the extra foot does not justify the additional ecological damage it will cause.

Broward County might move forward with applying for permits for the extra dredge depth but would have to pay for the work. Extra funding is expected from Port Everglades revenues.

There is an outside chance that the request for increased depth will cause the port to miss an end-of-the-calendar-year deadline for the next round of federal funding, so any campaign for additional depth could influence the start of the project.

TBW refills repaired reservoir. For the second time, the C.W. Bill Young Regional Reservoir in Hillsborough County is being filled with water diverted from the Alafia River.

Tampa Bay Water built the 1,100-acre reservoir about a decade ago, intending to store 15 billion gallons of raw drinking water before treatment. But within a year of first use, large cracks opened up in its concrete walls.

An ensuing investigation attributed the cracking to excess pressure during drawdowns due to lack of drainage behind the walls. DEP reduced the authorized storage capacity of the reservoir to limit the chance of a catastrophic failure.

TBW sued the engineer and designer, HDR, a multinational engineering company specializing in technical architecture. TBW lost that case, but proceeded to rebuild the reservoir, this time hiring Kiewit Corp., an international construction, mining and engineering firm, to repair the reservoir wall for a cost of \$124 million.

Kiewit began filling the reservoir in July and finished work on a seawall intended to prevent waves produced by unusually high winds from overtopping the reservoir.

ASR in Palmetto. The city of Palmetto Public Works Department completed construction of an aquifer storage and recovery well.

The ASR system will inject treated wastewater and partially treated stormwater runoff underground for use during dry months.

The aquifer fed by the well is expected

to store more than 140 million gallons of water, pumped in during the wet season surplus.

Operationally, the public works department hopes to draw 2.4 million gallons per day for 30 days during the dry season to augment their drinking water supplies.

The ASR facility and well, now complete, will undergo a testing phase for a few more months to address several key issues.

The first water pumped into and withdrawn will be amended with sodium

bisulfite to leach arsenic from underground rock formations.

Water pumped in will be sterilized using UV treatment and a testing protocol

will be performed daily over a 30-day period to ensure adequate sterilization.

The current test phase requires cooperation from Mother Nature to provide sufficient rainwater for injection. Assuming adequate water availability, the succession of pilot tests could be completed as early as this fall.

Work on the project began a decade ago with a \$2.3 million price tag to be shared equally by the Southwest Florida Water Management District and the city of Palmetto.

In 2007, the Manasota Basin Board contributed \$389,000 for well design and permitting, and an additional \$272,000 in 2008. Also in those years, the Water Protection Sustainability Trust Fund contributed \$208,000. In 2013, SWFWMD contributed an additional \$405,000. The total cost is now about \$3.5 million.

Clay reclaimed water project. The Clay County Utility Authority and the St. Johns River Water Management District agreed to jointly fund a 135-million-gallon reclaimed water storage reservoir adjacent to the Mid-Clay Wastewater Treatment Facility in Middleburg.

The project includes construction of nine infiltration cells to receive reclaimed water. Those cells will be constructed on the highest ground of the treatment facility site.

Gravity flow will draw water into the surficial aquifer under the storage cells. The infiltration cells are designed to handle up to 2.2 million gallons of water per day.

The project provides multiple benefits. Water stored during the dry season will increase supply reliability.

In addition, it will conserve water normally drawn from the St. Johns River and Floridan Aquifer.



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Former power plant site in Fort Pierce inches toward redevelopment

By ROY LAUGHLIN

Imagine how lucky a city would feel if it reclaimed a few acres of prime waterfront property for redevelopment after clearing away a century-old power plant.

That's what's happening now in Fort Pierce. However, the anticipation has been tempered by the realities of site cleanup complications.

Debris removal and treatment efforts for petroleum contamination in the soil have gone through several iterations, with some progress. But more work is required.

"The cleanup is going to extend into June of 2016 if we don't have a developer who wants to expedite things a little bit," said John Andrews, PE, city engineer for Fort Pierce.

Fort Pierce was one of the last cities along the Indian River to operate a municipal power plant, the H.D. King Power Plant, in its downtown area on the shores

of the river.

The first dynamo, used in the early decades of the 20th century, was a steam engine fueled by wood. In the 1930s, the plant was upgraded to burn petroleum fuel.

Over time, the facility expanded to two additional adjacent lots off the river front. Transformers occupied one of them and a cooling tower was built on the other.

In 2009, the Fort Pierce Utilities Authority permanently closed the plant. It tore down the three-story building housing the generating equipment and the water cooling tower, and removed the transformers.

Contractors removed 11,800 tons of soil and other debris from the lots down to four and half feet below surface level.

City officials and their consultants expected those efforts to leave all three parcels ready for Fort Pierce's Community Redevelopment Agency to begin construction as part of redevelopment.

But additional problems came to light after the original soil and debris removal.

"I would say the biggest (issue) is that we found contamination below the original design depth, below virgin ground, down below nine feet," said Andrews.

The news was not all bad, however. Only two of 11 monitoring wells showed continuing petroleum contamination.

The two adjacent parcels that housed the cooling tower and the transformer facility have received closure notices from the Florida Department of Environmental Protection.

The additional efforts have increased project costs. The U.S. Environmental Protection Agency provided Fort Pierce's CRA with \$600,000 and Cardno ENTRIX

began the cleanup effort.

During the first phase of cleanup, additional foundation and piping were removed, adding more costs to the project. The city then dipped into a contingency fund and borrowed \$300,000 from the Treasure Coast Regional Planning Council.

So far, more than \$2.6 million has been spent to cleanup the site.

FPUA has budgeted funds for completing work through 2016 and expects to finish the project—if no more surprises pop up. The additional costs may be reimbursed to the city through state voluntary cleanup tax credits.

PEER remains highly critical of DEP enforcement shift

By BLANCH HARDY, PG

Public Employees for Environmental Responsibility released a report in September noting that pollution fines collected this year in Florida fell by 57 percent over last year.

The report followed closely on the heels of an August PEER news release indicating that an evaluation of federal data showed that facilities with major wastewater discharges remain in violation of their Clean Water Act permits.

PEER is an alliance of local, state and federal environmental professionals. It provides a platform of anonymity through which government employees and PEER members who feel at risk professionally or personally can report violations and act within the protective envelope of attorney-client privilege to seek resolution of potentially serious events and practices that threaten the environment.

PEER's attention to enforcement fines and penalties resulted from a shift in DEP's focus from enforcement to compliance. A similar shift occurred in the late 1980s and early 1990s when applicant requests for participation in the newly created petroleum storage tank program overwhelmed the department's capacity to process them.

"We believe in prevention—what we can do to prevent impacts to our natural resources," said DEP Press Secretary Tiffany Cowie. "We work with companies,

allowing them to maintain compliance. If they try to bend or break the rules, we'll take action and use every tool at our disposal for holding bad actors accountable."

PEER Executive Director Jeff Ruch, though not suggesting compliance is a problem, said that the department needs to take enforcement action when repeat notices are issued and persistent noncompliance occurs. This provides more incentive for the "bad actors" to comply.

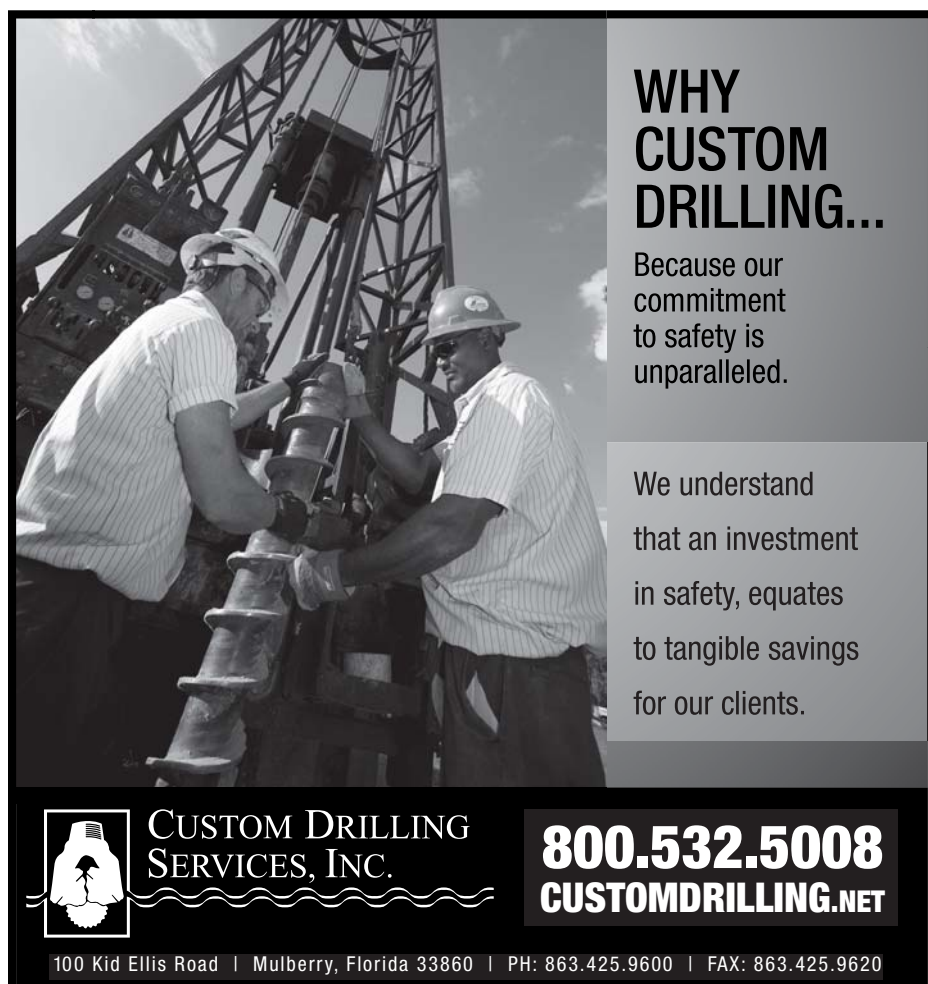
PEER's August press release is the result of a federal-state breakdown, Ruch noted. "PEER is working with records obtained through the Freedom of Information Act on larger facilities, with one or greater mgd (releases)," he said. "We want to know the amount of fines assessed and how much of the assessed fines were collected."

To PEER, the U.S. Environmental Protection Agency is equally responsible for failing to take enforcement action against the state of Florida for its failure to enforce water quality standards.

But DEP's Cowie approaches the effectiveness of violations differently.

"During the last three years, the Florida Department of Environmental Protection has made great strides toward protecting Florida's environment," she said. "Compliance rates across the department's regu-

PEER
Continued on Page 16



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Day One, Thursday, Oct. 9, 2014

9:00 **Opening Address from the Conference Chair**
Nick Albergo, PE, DEE, Senior Engineer, CRA, Tampa

9:30 **Session 1B: A New Model: Recovering Remediation Costs from Old Insurance Policies**
John Malanchuk, PhD, Eisenstein Malanchuk LLP, Washington, DC
John Fumero, ESQ, Nason Yeager Gerson White & Lioce PA, Boca Raton
While traditional funding sources for remediation costs have become more limited, new models are needed for cost recovery. Although not widely known in Florida, insurance recovery has

been employed on dozens of sites by policy holders seeking to offset remediation costs. A policy holder might be a company, a city or county. Any entity with historical environmental liabilities, or contractors working for a policy holder should evaluate the merits of insurance recovery. Not to do so ignores a potential major funding source for remedial costs. A general liability insurance policy covers third party property damage that isn't specifically excluded. After 1985, there are pollution exclusions in GL policies meaning that coverage for events taking place now or in the future require you to have some sort of environmental policy. Prior to 1972, however, there were no pollution exclusions in GL policies. If site remediation today includes contamination that might have begun prior to 1972, it may be possible to make a claim under an insurance policy that was in effect when the contamination was occurring. Another important aspect of old GL policies is that they were written on an "occurrence" basis. Today, policy wording requires making the claim during the policy period. Formerly policy wording required only that the accident had to occur during the policy period, meaning that a claim can still be made on a policy that might be more than forty years old. Over the years, millions of dollars in claims have been lost because policy holders were unaware of this opportunity. No one with remedial obligations should ignore this potential funding source.

Session 2: In-Situ Chemical Oxidation

10:30 **Session 2A: Evaluation of Advanced Oxidation Process Treatment Options for Extracted Groundwater with Chlorinated Solvents, Aromatics and 1,4-Dioxane**
Antonio Cardoso, EI, Project Engineering Specialist, ARCADIS, Tampa
As a result of historic site operations, groundwater has been impacted with 1,4-dioxane, chlorinated ethenes, chlorinated ethanes and aromatics. Site activities included, but were not limited

to, the manufacturing of electronics and communication hardware. Assessment activities were conducted to develop a high-resolution conceptual site model and improve understanding of the nature and extent of the constituents of concern. The driver and challenge for remediation is 1,4-dioxane because it is difficult to treat and has not been shown to naturally attenuate, except through dilution in aquifer environments. Selection of the appropriate technology for the extracted groundwater was essential to ensure compliance and treatment objectives. As an initial phase, a pump-and-treat system was installed as an interim remedial action, which provided the opportunity to test two advanced oxidation processes side-by-side. The AOPs tested were the HiPOx™ system developed by ULTURA, former APTwater Inc., and the Photo-Cat system developed by Purifics® ES Inc. The IRA was operated in batch and continuous modes with data collected for the evaluation

of AOP performance and optimization. The batch mode phase facilitated testing of different influent water quality, such as metal concentrations, 1,4-dioxane and/or volatile organic compounds load, while the effects of long-term groundwater extraction and AOP operation were observed through the continuous mode phase. The AOP systems were evaluated based on six criteria: treatment efficiency; treatment train complexity; chemical input; power usage; operation and maintenance; and economics. The results of this evaluation, the technical merits of each system and the performance of the IRA will be presented.

11:00 Session 2B: In-Situ Chemical Oxidation of Pentachlorophenol and Dioxins/Furans at a Unique Cultural Site

William Lundy, President
DeepEarth Technologies Inc., Alsip, IL
The Wiyot people inhabited Indian Island and the land around Humboldt Bay since prehistoric times. On Feb. 26, 1860, European settlers massacred an estimated 180 Wiyot villagers. Settlers claimed the land on the island until 2000 when the Wiyot Tribe purchased the

1.5-acre parcel where a shipyard was located. During occupation by the settlers, the site was contaminated with pentachlorophenol and dioxin/furan compounds and other chemicals used for preserving wooden ships. The objective of the cleanup project included: removing the majority of pentachlorophenol/dioxin-impacted soil, while minimizing the volume of soil disturbed; finding a technology to treat the remaining contamination on-site without damage to the contaminated shell mound; preventing impacts to groundwater or surface water; preventing human exposure to soils impacted with PCP and dioxins; and restoring the site for beneficial use. Cool-Ox® was selected for the ISCO bench-scale treatability study. Cool-Ox demonstrated significant reductions in contaminants of concern. Dioxin/furan TEQ was reduced by 84% and PCP was reduced by 86.4%. Cool-Ox destroyed the contaminants without destroying artifacts or remains on the historical burial grounds. The island site, in a tidally influenced bay of Pacific Ocean, provided no direct road access or functional dock facilities. Access was limited to boat at high tide or by foot from a bridge landing at low tide, and no electricity or municipal water supply was available. Added to that, there were significant cultural constraints. The comparison of soil analytical results from co-located pre- and post-ISCO soil samples indicated that the ISCO solution was effective in reducing concentrations of CoC. This allowed continued restoration of the site for beneficial use by the Wiyot Tribe. This case history and field data provide a valuable tool for the remediation community to evaluate this oxidant and treatment train for the restoration of similarly challenging sites.

11:30 Session 2C: Evaluation of Multiple Biotic and Abiotic In-situ Treatment Methods for the Remediation of a Commingled TCE and Metals Plume

Chad Northington, PE, Senior Engineer, WRS Infrastructure & Environment, Tallahassee
Continued vertical migration of a commingled trichloroethene and metals plume into the Floridan Aquifer at a former FDOT maintenance yard prompted implementation of a pilot study to evaluate the performance of several remedial alternatives simultaneously, prior to full-scale remediation. The study consisted of a series of discrete injections focused around three monitoring wells with a different technology and approach implemented at each location. The pilot test was intended to reduce overall remedial costs, mitigate performance uncertainties and expedite site cleanup by providing field data that would allow the full-scale approach to be tailored to the results of the study. Catalyzed hydrogen peroxide was continuously injected in the vicinity of a source well via a network of permanent injection wells fed by a vendor-provided system. Ferrous iron, controlled-release organic carbon substrate and DHC inoculum were injected directly during a single event with direct push technology. Sodium persulfate was injected into an existing monitoring well where depth limitations were a concern for DPT utilization. Prior to injections, more precise geotechnical data was obtained to better define the site model, improve the design approach and facilitate acquisition of hydrogeological parameters through utilization of the hydraulic profiling tool. Besides multiple contaminant classes that respond differently to treatment, the site presented additional challenges, such as inferred off-site contamination, large variations in geochemistry, elevated aluminum background concentrations, ongoing assessment and limited site access to adjacent properties. Field tests and measurements were also performed to evaluate the effectiveness of the various approaches.

12:00 **Day One Luncheon**
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Session 3: Field Tools

1:30 Session 3A: Real-Time Flux Measurement Using Direct Sensing, Quantitative Discrete Sampling and On-site Analysis

Brad Carlson, Manager-Direct Sensing Tools, ZEBRA Environmental, Tampa
William Davis, PhD, Principal, Triad Environmental Solutions Inc., Durham, NC
The objective of data collection during site characterization is to provide decision makers with data of sufficient quantity and quality to allow definitive decisions on remedial actions. Recent advances in tools for the collection of high density hydro-stratigraphy and high density soil and groundwater contaminant data have allowed implementation of cost effective strategies for mapping contaminant flux in high resolution. One of the key requirements for successful high density site characterization projects is a reliable real-time field analysis for the contaminants and matrices of concern. Data required to understand contaminant flux include local geologic and hydrogeologic conditions as well as contaminant distribution in groundwater and bulk phase soil. This presentation discusses the tools currently available to collect data to allow an understanding of flux at sites at the scale required to design and implement remedial actions. Case studies will be presented where U.S. EPA Method 8265 was used to collect contaminant data in conjunction with the hydraulic profiling tool to measure hydraulic conductivity to determine the flux distribution at complex DNAPL sites. These data are collected in real-time allowing flux measurements in real-time. Case studies demonstrate the use of flux measurements to determine contaminant transport zones and, perhaps more importantly, zones where back diffusion from non-advective groundwater contamination is occurring.

1:55 **Session 3B: BTEX & MTBE Remediation in Challenging Florida Geology at Two Separate Sites Using ISCO/BIO Injections**
Brian Timmins, Principal, ETEC LLC, Washougal, WA
To address elevated BTEX concentrations in groundwater at two separate sites in Chipley, FL, a unique remediation approach combining iron-catalyzed hydrogen peroxide (Fenton's reagent)

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followed by bioamendments was applied at two sites. Each site injection event required three to four days and included simultaneous groundwater extraction with the ISCO/BIO injection. Substantial reductions in dissolved BTEX concentrations were achieved following the injection event at each site. Because of the mixed geology/hydrogeology at each site, significant injection/extraction challenges were encountered including off-gassing due to aggressive in situ chemical reactions, poor groundwater recovery, injection short-circuiting, and significant backpressure of fluid injection lines. These site-specific challenges and groundwater data are discussed in detail. At Site #1, following a source area soil excavation project, residual dissolved BTEX and MTBE constituents remained in the intermediate and deep groundwater zones. Treatment goals were Florida GCTL criteria and the ISCO/BIO pilot study was implemented around the most impacted site well. Following installation of several injection/extraction wells, the ISCO/BIO pilot study injection event was performed in January 2013, and six months later. The most impacted well had maintained an 85% reduction in BTEX and a 90% reduction in MTBE concentrations. Surprisingly, significant BTEX reductions were also noted in the intermediate groundwater zone in wells approximately 40 feet away from the injection wells. This larger-than-expected zone of influence is attributed to the permeable fill material in the excavation area. Site #2 contained an area with persistent dissolved-phase BTEX constituents in both the intermediate and deep groundwater zones. In the deep groundwater zone, benzene had migrated off-site across a roadway. Following installation of several injection/extraction wells in both zones, a pilot-scale ISCO/BIO injection event was performed in October 2013. Groundwater sampling performed three months after the pilot study showed three of the four wells in the target treatment area exhibited greater than 99% reductions in total BTEX. The other well, which is installed in tight silt/clay matrix, showed no change in BTEX concentration. During the pilot, massive site-wide off-gassing was noted in response to ISCO injections, indicating an aggressive in-situ chemical reaction. This slowed injection rates. Contact throughout the target subsurface soil/groundwater zones was confirmed via changes in pH and conductivity in monitoring wells adjacent to the fluid injection wells. Attempts to perform simultaneous groundwater extraction in the intermediate groundwater zone failed due to low or non-existent groundwater extraction rates. Groundwater extraction in the deep groundwater zone was more successful, resulting in successful remediation of the off-site deep groundwater well.

2:20 Session 3C: **Application of MIP/HPT Logging for Source Zone Characterization and Water Quality Evaluations for Enhanced Conceptual Site Model Development**

Cathy Soistman, PE, Project Environmental Engineer, Geosyntec, Titusville

The development of an accurate, effective conceptual site model is crucial with regards to transitioning a complex site from assessment to remediation. Upon initiating work at a site with an extended assessment history, Geosyntec questioned the CSM and suspected that there was an undiscovered source contributing to the dissolved plume, and that the plume configuration may be a partial result of well construction contributing to vertical migration. To evaluate the first hypothesis prior to embarking on large-scale remediation efforts, an emerging assessment technology was used consisting of subsurface logging with a hydraulic profiling tool in combination with a membrane interface probe. Focused saturated zone soil and groundwater sampling was conducted. To evaluate the second hypothesis, geochemical parameters were evaluated to ascertain whether chlorinated solvent impacts in a monitoring well screened in the Floridan Aquifer were potentially attributable to vertical leakage from surficial aquifers along the outside of the well casing. During the initial development of the revised CSM, a review of the HPT and MIP logs indicated that there was a strong correlation between mass storage in low hydraulic conductivity zones and zones of apparent dissolved plume transport. Based upon the MIP/HPT boring program, focused direct-push technology soil and groundwater sampling confirmed the presence of a previously undiscovered area of elevated concentrations of tetrachloroethene in low hydraulic conductivity clay layers and associated plume transport from these layers. Elevated tetrachloroethene concentrations up to 1,700 milligrams per kilogram in saturated soil and up to 400,000 micrograms per liter in groundwater confirmed the MIP/HPT findings. The investigation of the Floridan Aquifer well focused on a comparison of water quality conditions within the surficial aquifer, within the Floridan and within the referenced well. A Piper diagram was used to evaluate geochemistry and document apparent cross-connection of aquifers due to well leakage. Collectively, questioning the CSM and developing an accurate CSM for the site has provided valuable information for developing a focused remediation design and for enhancing understanding of the dissolved plume attributes.

2:45 Session 3D: **Emerging Tools Used for In-Situ Chemical Oxidation/Reduction Projects**

Ron Adams, PE, LSRP, Executive Vice President Remediation, ERFs LLC, Boston, MA

ISCO and ISCR projects can be successfully implemented under pay for performance contracts relying on real-time monitoring and process adjustments. Due to significant mobilization and setup costs, it is more cost efficient to adjust treatment techniques during a field event rather than after the fact. This eliminates remobilizing crews, materials and subcontractors to the site. Real-time monitoring incorporates down-well trolls and data loggers, hand-held instruments to measure groundwater and vapor space parameters, soil resistivity surveys to depict geochemical changes on cross sections and commercially available field test kits. Further, many field observations can be relayed to remotely located design engineers using mobile phone pictures and videos sent via the Internet. As real-time data is received, design engineers can adjust field crew instructions to make the best use of the field event. This talk presents this information in overview and then delves into specific projects utilizing these techniques with graphically presented data and pictures. Sites will include Superfund, RCRA and gas station sites within the U.S.

3:05 Session 3E: **SERDP Study Explores Well Flow Dynamics for Active "Purge" Sampling and Newer "Passive" Sampling Approaches**

Sandy Britt, PG, CHG, Principal, ProHydro Inc., Fairport, NY

Low flow purging and sampling techniques were introduced to limit purge volumes, reduce turbidity and agitation during sampling, and to improve repeatability. Passive, no-purge samples likewise have been introduced to improve sampling by limiting waste generation and improving cost structures. How do these methods reflect aquifer concentrations? Do they represent aquifer concentrations differently? Strategic Environmental Research and Development Program Project ER-1704 tested passive and dynamic sampling procedures in the lab, in the field and in model domains to better understand flow dynamics in wells. Results describe a flow field where water moves horizontally from the formation to the well, then moves vertically in the well bore to the pump intake during pumping. Under un pumped conditions, results show vertical transport and mixing due to tiny density contrasts. In many cases, several well volumes were required to clear the well and reach chemical steady state. Ultimately, maintenance of steady flow rate, very stable parameter measurements and purging several well volumes is required to assure flow-weighted average samples using a low-flow purging approach. "False" stability is a concern in early purge times as slow parameter drift may reflect continued contaminant concentration change. Passive sampling approaches usually yielded similar results without purging due to the vertical density mixing effect, but care was necessary to understand whether stratification in the aquifer was homogenized or partially maintained in the unpurged well. Determination of these effects required substantial effort and is probably not warranted for standard monitoring. However, the study is informative in that it explains some of the dynamics associated with why passive and active samples often yield similar chemical results, and illustrates why practitioners must always pay attention to seemingly unimportant details such as slow purge parameter drift.

3:30 Afternoon Break

Session 4: **Sorption**

4:00 Session 4A: **Sorption Coupled with Enhanced Biodegradation to Treat Petroleum and Chlorinated Contaminants in Groundwater**

Kristen Thoreson, PhD, Staff Scientist, Regenesis, San Clemente, CA

Enhanced biodegradation and monitored natural attenuation are effective, widely-used tools for elimination of organic contaminants in groundwater. However, the timeframe for treatment by these methods can be on the order of months to years. To significantly improve remediation performance beyond that of traditional enhanced bioremediation, a new in-situ colloidal biomatrix has been developed that accelerates biodegradation and drastically shortens the timeframes for reaching groundwater treatment goals. This presentation demonstrates the efficacy of a colloidal in-situ remediation agent that consists of highly sorptive activated carbon particles stabilized to transport widely through an aquifer upon injection. The stabilized colloids deposit on soil surfaces, forming a biomatrix that traps contaminants and accelerates their degradation. Some advantages of this approach include a rapid drop in groundwater concentrations, along with the ability to stop plume migration and protect sensitive property boundaries or environmental receptors. It is hypothesized that the protective effects of the colloidal agent last many years after its application. The presentation reviews the performance of the colloidal biomatrix material on multiple field sites with varying contaminants and site conditions. Data are presented from both the source and down-

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From Page 7

gradient plume area at a former leaking underground storage tank near a school. The direct-push application was a combined remedy that coupled the colloidal biomatrix with oxygen delivery to promote aerobic biodegradation. The presentation provides pre- and post-application soil cores to demonstrate zone of influence as well as groundwater monitoring to show >99% contaminant reductions within three months of application. A second site is discussed that shows contaminant reductions >99% for TCA and TCE. Overall, the presentation focuses on demonstrating field performance through evaluation of the distribution of the biomatrix and the corresponding contaminant reductions.

4:20 Session 4B: Use of Colloidal Mg(OH)₂ for Aquifer pH Adjustment from Concept to Laboratory to Field scale

Brad Elkins, MS, PG, Technical Support
EOS Remediation LLC, Raleigh, NC

Aquifer pH has a major impact on contaminant mobility and attenuation including precipitation/sorption of metals and degradation of chlorinated solvents. However, adjusting aquifer pH can be challenging due to strong buffering by clays, iron oxides and sorbed Al³⁺. Commonly used bases can result in excessively high pH while others offer relatively low alkalinity/lb. Mg(OH)₂ has many advantages over traditional alkalis including lower equilibrium pH, greater alkalinity/lb and slow release over time. Despite these benefits, distribution of an aqueous Mg(OH)₂ suspension in situ can be complicated by attractive forces between the positively-charged Mg(OH)₂ particles and the negatively-charged aquifer sediments. For several years, EOS worked to develop methods to alter the surface charge of Mg(OH)₂ to improve subsurface transport. Laboratory studies demonstrated that colloidal Mg(OH)₂ suspensions could be transported through the columns packed with aquifer sand without significant permeability loss. The time before suspension breakthrough into the column effluent varied with surface treatment, indicating the Mg(OH)₂ retention could be controlled by varying the suspension surface treatment. These lab results were used to develop a colloidal Mg(OH)₂ formulation, CoBupH-Mg, where the particle size, surface charge, degree of flocculation and settling rate are controlled to enhance transport and distribution throughout

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the treatment zone. A pilot scale injection was performed in Virginia in February 2013. Results demonstrated pH increase over a one-year period at or above pH 6 and achieving pH adjustment over baseline samples up to 30 feet down gradient. These results demonstrate the ability of CoBupH-Mg to transport and adjust aquifer pH which can be used to enhance chlorinated solvent biodegradation in low-pH aquifers or to manipulate the dissolution of metals

4:40 Session 4C: **In-Situ Remediation of Commingled Plumes Utilizing an Injection Program for pH and Alkalinity Optimization**

Chad Hanna, Env. Engineering Specialist
ARCADIS, Tampa

The site is a chemical packaging and distribution center in operation since 1982. In July 1998, approximately 800 gallons of acetone were released during rail car unloading operations. Following the excavation of impacted soils, various phases of investigation were conducted to complete site characterization and groundwater plume delineation. The groundwater data revealed the presence of commingled plumes of aromatic and chlorinated volatile organic compounds in the surficial aquifer system. Intrinsic reductive dechlorination has been observed at the site, as evidenced by the presence of degradation products since initiation of groundwater monitoring in 1999. Despite the continued presence of aromatic VOCs, which can be utilized as electron donors for reductive dechlorination, declines in chlorinated VOC concentrations slowed and stabilized between 2005 and 2009. The lack of recent active reductive dechlorination has been attributed to low groundwater pH and limited buffering capacity in the aquifer. A pilot test was performed between March 2010 and December 2011 to evaluate the feasibility of an injection program to restore subsurface conditions and enhance reductive dechlorination processes. Based on the results of the pilot test, a combination of in-situ pH and alkalinity amendments coupled with monitored natural attenuation was proposed as the remedial approach for the site. The implementation of the full-scale remedy was initiated in April 2013. The initial performance and ongoing optimization of the remediation program are presented.

5:00 **FRC Reception**

**Day Two
Friday, Oct. 10, 2014**

Session 5: Laboratory Tools and Techniques

9:00 Session 5A: **Efficiency of an Online Chain of Custody Service**

Kent Patton, Global Managing Director
Promium LLC, Bothell, WA

A web-based online service provides an efficient, accurate and reliable process to replace paper-based chains of custody. This talk describes the components and benefits of one of these: EnviroChain from Promium, an online chain of custody service for environmental engineers, consultants and laboratories. For at least the last 40 years, environmental scientists and laboratories have been using paper chains of custody to manage samples. Thousands of paper CoCs are handled every year in most labs. That paper-based system is inefficient—data must be entered on paper and then again in the LIMS. It is also inaccurate—every time data is hand written and then transcribed repeatedly creates potential for data entry errors—and unreliable with the possibility of paper CoCs getting damaged or lost. A web-based electronic chain of custody service not only addresses those issues, it delivers a rich source of data in near real-time for laboratory project planning and sample management. The result is a reduction in costs and headaches. With the explosion in the use of smart phones and tablets, there is finally a field technology that can truly leverage web applications for managing chains of custody. Coupled with a tight integration with a laboratory information management system, the flow of data is accelerated from the field to final report.

9:30 Session 5B: **Interpreting 3D-CSIA Forensic Data: A Step-By-Step Demonstration**

Yi Wang, PhD, Director, Pace CSIA Center of Excellence, Pittsburgh, PA

Three-Dimensional Compound Specific Isotope Analysis has been demonstrated to be a promising approach for chlorinated solvent release site investigation. Obtaining carbon, chlorine and hydrogen isotopic signatures of PCE, TCE and their daughter products in groundwater, soil and vapor samples helps distinguish multiple release sources and assess biodegradation. However, how to interpret a 3D-CSIA forensic data report has been a big challenge to many site managers. It requires a full understanding of isotope geochemistry, stable isotope forensic approach and science-defensible interpretation based on the site information. For example, the typically negative isotope ratios obtained by 3D-CSIA for the target analytes are different from the positive concentrations obtained by the traditional EPA Method 8260B for the same analytes. Further, altered isotope ratios due to certain weathering effects like in-situ degradation, if occurring to the target analytes, would give data interpreters a lot of trouble, especially when they want to apply such data for contaminant source identification. During this presentation, a complicated PCE/TCE release site case study is presented to demonstrate step-by-step how we interpreted one of our 3D-CSIA data reports. Concentrations and carbon, chlorine and hydrogen isotope ratios of PCE, TCE and cDCE were measured in 31 shallow and deep groundwater samples from the site. In these samples, at least eight PCE sources and one TCE source were distinguished based on the isotopic signatures and the locations of the samples. Potential contaminant sources could be from a variety of historic industrial activities at the site.

10:00 Session 5C: **Optimization of Metals Remediation using Column and Microcosm Studies**

Jeff Roberts, Laboratory Manager
SiREM Laboratory, Guelph, ON, Canada

Metals remediation can be complex given the sensitivity of metals to geochemistry, in particular pH and redox potential. Remedial efforts such as the addition of electron donors can alter the redox state of an aquifer, thereby affecting the solubility and mobility of metal species. Furthermore, metals are often toxic to microorganisms and may be inhibitory to bioremediation of other compounds, such as chlorinated solvents, with implications for sites with commingled contaminants. Laboratory treatability studies are commonly used to evaluate remedial options prior to field implementation for a wide variety of contaminants including metals such as arsenic, chromium, zinc and nickel, chlorinated volatile organic compounds, petroleum hydrocarbons and polycyclic aromatic hydrocarbons. Treatability studies are used to determine the impact of amendments, electron donors, oxidants, zero valent iron and the effects of remediation efforts under various scenarios. This presentation focuses on the use of treatability

studies to evaluate treatment options for metals. Case studies of laboratory batch and column treatability studies will be presented. In one study, effective dechlorination of trichloroethene was not observed until hexavalent chromium concentrations were reduced, at which point TCE dechlorination commenced and provided valuable information for managing the full scale remediation. Laboratory scale studies can be performed in both batch microcosms and continuous flow through columns. Batch microcosms offer the advantages of low cost and the ability to practically test numerous treatments simultaneously. Flow through column studies offer the advantages of simulating the movement of groundwater through an aquifer or permeable reactive barrier and are ideal for understanding the impact of geochemical gradients. Column studies can be used to evaluate design parameters such as amendment effectiveness, PRB residence time and treatment longevity under site specific conditions.

10:30 Morning Break

11:00 Session 6: Panel Discussion:

Performance-Based Assessment of Post-Closure Care at Landfills

Moderator: Mark Hudgins, Conestoga Rovers & Associates, Orlando
Panelists: Emerson Raulerson, PE, Professional Engineer, DEP, Jacksonville
Neal Hornick, PG, Professional Geologist, DEP, Jacksonville

In Florida, prescriptive post-closure care periods for closed landfills can last 30 years or longer. However, there are regulations that allow for the reduction of this period provided it can be demonstrated that such reductions will not negatively impact human health and the environment (FAC 62-701.620(3)). Over the last three years, reductions in groundwater monitoring have been granted via permit modification for 36 of 42 facilities reviewed so far, resulting in cost savings of more than \$3.6 million. This panel, including an industry expert, state regulators and a facility manager, will discuss PCC re-assessment programs. The focus of the discussion will be to review such activity and projects, discussing requirements for PCC reduction candidacy and the development of consistent, state-wide criteria for performing such assessments in Florida.

12:00 **Day Two Luncheon**

1:30 Session 7: **Annual Environmental Regulatory Panel Discussion**

Moderator: Glenn MacGraw, PG, Vice President, The FGS Group, Tallahassee
Panelists: Valerie Huegel, Program Administrator, Petroleum Restoration Program, DEP
Additional DEP representatives, *Invited*

3:00 Afternoon Break

Session 8: Fixation/Mobilization

3:30 Session 8A: **Chemical Fixation of Priority Heavy Metals in Soil, Sediment and Groundwater**

Using MetaFix™ Reagents
Patrick Hicks, PhD, SE Region Tech. Mgr.
PeroxyChem, Philadelphia, PA

High concentrations of heavy metals are found in many soil and sediment environments. At very high concentrations, heavy metals are known to create toxicity to microorganisms. Treatment approaches that rely on microbial process may not function well in an acutely toxic matrix because important processes such as carbon fermentation, oxygen consumption and biological sulfate reduction can be significantly slowed or completely inhibited. The understanding of many metals removal mechanisms operative in soil and groundwater

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EQ IS THE ANSWER.

From Page 9

has advanced significantly over the past decade—thus, we are now in a better position to develop a new platform of effective metal remediation products. In toxic environments, treatment reagents that do not depend entirely on microbial activity, but rather combine reduction with adsorption and precipitation of heavy metals, are advantageous. MetaFix™ reagents represent an entirely new family of products for treatment of soil, sediment, industrial wastes and groundwater contaminated with heavy metals. Treatment mechanisms based on iron, iron sulfides and other iron-bearing minerals have significant advantages due to lower solubility and greater stability of iron-bearing mineral precipitates formed with heavy metals. The new reagents enrich the aquifer with a mixture of reducing agents and processed reactive minerals. This new approach is insensitive to toxicity and will perform well even in environments that have high metals concentrations, high concentrations of organic contaminants such as solvents, high salt content or pH levels that would inhibit carbon fermentation and sulfate reduction. The approach used in these new reagents is to create an effective blend of reducing agents, reactive minerals, mineral activators, catalysts, pH modifiers and adsorbents for either ex-situ or in-situ applications. Dredge spoils containing high levels of TCLP/SPLP metals can be quickly treated and stabilized before final disposal. In-situ reactive zones can be constructed to prevent migration of heavy metals into sediments or surface water. MetaFix reagents can also be directly delivered into sediments for in-situ stabilization of heavy metals and thereby reduce exposure to aquatic life. Laboratory results showing reduction in TCLP and SPLP of key metals are presented.

4:00 Session 8B: **Advances in Surfactant Selection for LNAPL Remediation**

David Alden, Technical Associate, Tersus Environmental, Wake Forest, NC
A standardized approach to designing remedial actions requires complete removal of free-phase and residual NAPL. Nevertheless, NAPL can be quite difficult to remediate due to capillary forces that trap organics in soil. Surfactant enhanced aquifer remediation achieves these removal goals in a matter of a few weeks to a few months. In many cases, it may even make economic sense to remove as much LNAPL as practicable by applying surfactants before adding oxidants or reductants to the matrix. This talk focuses on the use of state-of-the-art surfactant solutions to mobilize residual LNAPL in the saturated soil of the subsurface. Surfactants typically found in household cleaning systems like laundry detergent or shampoo only lower the interfacial tension about one order of magnitude. This is sufficient because mechanical energy can be added to laundry or shampooing to mobilize the trapped oil. In a porous medium, however, the interfacial tension must be reduced by three or four orders of magnitude. Researchers at the University of Oklahoma blended a combination of surfactants that lowers the LNAPL-water interfacial tension to allow physical mobilization of residual LNAPL. The now mobile “oil bank” is then displaced by continuing flushing and withdrawal by the extraction wells. This presentation describes a remediation project that incorporated an optimized surfactant blend to maximize LNAPL removal and minimize waste at competitive costs.

4:30 Session 8C: **Treatment of Chromated Copper Arsenate Contaminated Water with Metsorb®**

Craig Cowdery, Senior Engineer
WRS Infrastructure & Env., Tallahassee
Treatment of highly contaminated chromated copper arsenate water at wood treatment facilities can be challenging and can generate RCRA hazardous waste. The use of a single adsorbent, such as Metsorb®, greatly simplifies the treatment process. Metsorb represents an innovative green technology that can produce a non-hazardous waste that passes the RCRA toxicity characteristic leaching procedure requirements. WRS Infrastructure & Environment Inc. was requested by U.S. EPA Region IV to perform emergency response at a 12-acre CCA wood treatment facility to treat residual water from the treatment area and water stored in tanks on-site in Jacksonville, FL. The facility was abandoned with all of the chemicals and waste unsecured. Metsorb had never been used to treat extremely high metal concentrations before, so a treatability test was performed to test adsorption capacity and effluent concentrations. Based on the treatability study results, approximately 200,000 gallons of highly-contaminated water were treated on-site using Metsorb. Another 100,000 gallons of the contaminated water were recycled by sending it to another facility for reuse in their CCA process. During operation of the adsorption unit, it was determined that metal adsorption was causing pH shifts that were affecting the Metsorb adsorption capacity and the system’s effluent concentrations. This was rectified by reducing the pH of the influent solution using hydrochloric acid. Upon treatment completion, TCLP was used to analyze the spent Metsorb and none of the spent material exceeded the RCRA toxicity characteristic.

5:00 **2014 conference adjourns**

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gaining useful data,” a conclusion he will explain further in his talk.

Back when remediation experts worked with a single-treatment mentality, the mantra of “treat, measure, and repeat if necessary” was dominant. Now, with site and contaminant assessments, practitioners can develop layered “if-then” scenarios.

In-situ treatments, the preferred mode on a majority of complex sites today, depends innately on monitoring to orchestrate those “if-then” decisions. New sensors and increasingly sophisticated handheld field instruments are being developed and put into use every day.

Environmental labs are adding these capabilities to their traditional wet chemistry services, and connecting sites to the labs by cellular data transmission and cloud-based retrieval capability.

Managing solubility is another scenario that weaves its way through several sessions this year. Sorption, binding and desorption are physico-chemical processes that influence, either positively or negatively, chemical reactions used to chemically modify contaminants. “Exploiting” is a key concept of the scenario.

Twenty years ago, pump and treat methods depended on effective surfactants and medium modifications to desorb organics or ionize metals. Now, with risk-based remediation targets, project scenarios with treatments to enhance sorption of low solubility organics and immobilize metals are more common.

A site can first get treatments to solubilize some contaminants, then a follow-up treatment to immobilize, with no usual order in treatment type for all sites.

David Alden, a technical associate with Tersus Environmental in Wake Forest, NC, will talk about designing surfactants, based on the physico-chemical characteristics of specific target compounds in mind.

“We will present a surfactant blend design specific for major petroleum hydrocarbon groups,” said Alden. “These surfactant blends in combination with one or more electrolytes have proven capable of producing ultra-low interfacial tensions between NAPL and groundwater that basically make NAPLs more soluble.”

The enterprise of environmental cleanup is another theme that weaves its way through several talks. This year, two talks specifically address financial and record-keeping scenarios.

John Malanchuk, PhD, a nonattorney partner with Eisenstein Malanchuk LLP in Washington, DC, and John Fumero, an attorney with Nason Yeager Gerson White & Lioce PA in Boca Raton, will describe the prospects for funding remediation projects with proceeds from insurance policies purchased decades ago.

Insurance purchased then may pay for remediation efforts now.

“There are still many opportunities available for smaller companies and public entities,” said Malanchuk. “Our presentation explains the process, providing food for thought to those who deal with environmental liabilities and struggle with how to fund remediation.”

Handling paperwork is one chore that rarely improves with complexity. Kent Patton, global managing director with Promium LLC in Bothell, WA, will describe a new cloud-based application that can remove paper from the chain-of-custody process.

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Calendar

October

OCT. 1-2 – Summit: 6th Annual Southeast Florida Regional Climate Leadership Summit, Miami, FL. Presented by a partnership of South Florida cities and counties. Visit <http://southeastfloridaclimatecompact.org/the-summit/>.

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

OCT. 3 – Course: 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.

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

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

OCT. 6-8 – Course: Asbestos: Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 9-10 – Conference: 20th Annual Florida Remediation Conference, Orlando, FL. Presented by NTCC Inc., publishers of the *Florida Specifier*. Call (407) 671-7777 or visit www.enviro-net.com.

OCT. 9-10 – Course: Asbestos: Management Planner, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 10 – Course: Backflow Prevention Recertification Review, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11 – Course: Backflow Prevention Recertification Exam, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 11 – Course: Backflow Prevention Recertification Exam, Bradenton, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 13 – Course: Hazardous Waste Regulations for Generators, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 14 – Course: U.S. DOT Hazardous Materials/Waste Transportation, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 14-15 – Course: Initial Training Course for Transfer Station Operators and Materials Recovery Facilities – 16 Hours, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 14-16 – Course: Initial Training Course for Landfill Operators and C&D Sites – 24 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 14 – Course: Initial Training Course for Spotters at Landfills, C&D Sites and Transfer Stations – 8 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 14-15 – Course: Refresher Training Course for Experienced Solid Waste Operators – 16 Hours, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 14 – Course: Refresher Training Course for Experienced Solid Waste Operators – 8 Hours, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

OCT. 14-16 – Course: Initial Training for Operators of Landfills and Waste Processing Facilities Course for Spotters at Landfills, C&D Sites and Transfer Stations – 8 Hour, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 15 – Course: Refresher Training Course for Experienced Solid Waste Operators – 8 Hours, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 15 – Course: Refresher Training Course for Experienced Solid Waste Operators – 4 Hours, Tallahassee, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 17 – Seminar: Charting the Future of Biosolids Management, Fort Myers, FL. Presented by the Biosolids Committee of the Florida Water Environment Association. Contact Chris Collins at (941) 792-8811 or visit www.fwea.org.

OCT. 17-25 – Course: Backflow Prevention Assembly Tester Training and Certification, Fort Myers, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 20-24 – Course: Asbestos: Contractor/Supervisor, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 22-23 – Workshop: Water Facility State Revolving Fund Workshop, Jacksonville, FL. Presented by the Florida Engineering Society. Call (850) 224-7172 or visit www.fleng.org.

OCT. 22-24 – Meeting: Annual Fall Meeting of the Florida Society of Environmental Analysts, Ft. Lauderdale. Call (941) 748-5700 or visit www.fsea.net.

OCT. 23-24 – Symposium: Florida Transportation Data Symposium 2014, Orlando, FL. Presented by the Florida Engineering Society. Call (850) 224-7172 or visit www.fleng.org.

OCT. 27 – Course: Lead Refresher: Renovation, Repair & Painting, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 28 – Course: Health and Safety for Solid Waste Workers – Part 3 (am + pm), Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 28 – Course: Lead: Renovation, Repair & Painting, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 29 – Course: Heavy Equipment Safety, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

OCT. 29 – Course: Permit Required Confined Space Awareness, Gainesville, FL. Presented by the Uni-

versity of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

November

NOV. 1-9 – 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.

NOV. 1 – Course: Backflow Prevention Recertification Review, Bradenton, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 3-6 – Conference: 2014 AWRA Annual Water Resources Conference, Tysons Corner, VA. Presented by the American Water Resources Association. Call (540) 687-8390 or visit www.awra.org.

NOV. 3-7 – Course: Backflow Prevention Assembly Tester Training and Certification, Destin, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 3 – Course: Backflow Prevention Recertification Review, Altamonte Springs, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 3 – Course: Unidirectional Flushing Workshop, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 4 – Course: 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. 4 – Course: Lift Station Maintenance, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

NOV. 5 – 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. 5 – 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. 6 – Meeting: Environmental Roundtable for EHS Managers, Daytona International Speedway, Daytona, FL. Presented by the Florida EHS Roundtable. Call (321) 543-4414 or visit www.ehsroundtable.org.

NOV. 6 – Course: Backflow Prevention Recertification Review, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

NOV. 6 – 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. 7 – Course: 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.

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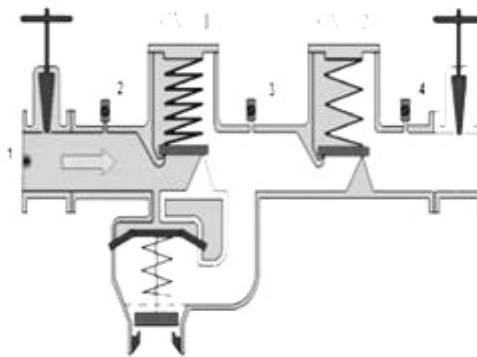


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SFWMD moves to ensure adequate water quantity to protect Kissimmee River ecosystem

By **BLANCHE HARDY, PG**

The South Florida Water Management District is embarking on adoption of the state's fifth water reservation to ensure enough flow to adequately protect fish and wildlife for the Kissimmee River Restoration Project.

"The governing board authorized staff to begin rule development on the Kissimmee Basin water reservation at their June meeting," said Randy Smith, lead media relations specialist with the district. "Staff

conducted the first rule development public workshop on July 30th in Kissimmee."

The water reservation rule is the state's legal mechanism for setting aside water for the protection of fish and wildlife, or for public health and safety. Once in place, the quantity and timing of the volume of water at specific locations is legally protected for associated natural systems.

The reservation rule prevents new users from accessing reserved water and pro-

tests existing legal uses that are not adverse to the public interest.

"Every reservation project is different because of the unique characteristics associated with the waterbodies, public feedback, technical analysis, draft rule language, statement of estimated regulatory cost and rule challenges," Smith said.

The supporting discussion for the district's authorization to publish Notice of Rule Development for the proposed Kissimmee River Reservation Project water reservation rule requires the adoption of new rules in Chapter 40E-10, Florida Administrative Code, and amendment of Chapter 40E-2, FAC, including the Applicant's Handbook for Water Use Permit Applications.

The natural systems listed are the Kissimmee River, its floodplain and upper chain of lakes as well as associated implementation rules.

During the workshop, district staff added protection of the greater than \$900 million public investment already made in the restoration of the Kissimmee River and its associated waters and lands.

Among the concerns of river advocates is the potential for basin surface waters to be allocated as alternative water supply for consumptive use.

"The availability of water from the lakes has been discussed as an alternative source, but few specific project proposals have been developed at this time," said

Smith. "Several potential users have expressed a willingness to work through the reservation rulemaking process first, and then determine if sufficient supplies of water are available for use beyond what is need for fish and wildlife."

The SFWMD governing board initially authorized reservation rule development to protect water for fish and wildlife in the Kissimmee Basin in 2008. Rule development workshops were held in 2009 to solicit input and to develop draft rule language.

A supporting document, Technical Document to Support Water Reservations for the Kissimmee River and Chain of Lakes (March 20, 2009), was published by the district but rule development was placed on hold as the district and the U.S. Army Corps of Engineers continued to work on regulation changes for the Kissimmee Upper Chain of Lakes.

The previously compiled technical information is being reassessed to determine the quantity of water needed for the reservation.

"Much of the time will be spent receiving public comment and feedback through the rule development process," Smith said. "The next steps are to update the draft technical document and develop draft rule language before the next public workshop."

According to Smith, rule development of this kind can be expected to proceed for a year to 18 months with legislative ratification anticipated prior to the new rule becoming effective.

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Glades' water quality earns passing mark

By **DAN MILLOTT**

Water quality in the Everglades received passing grades with samples showing a decline in phosphorus in the Everglades Agricultural Area, that part of the River of Grass dominated by the sugar industry.

The positive report was submitted to the South Florida Water Management District by the U.S. Army Corps of Engineers this summer. The 470,000-acre farming region showed a 63 percent drop in phosphorous in water leaving the EAA.

The Everglades Forever Act mandates a 25 percent reduction every year, so the report was good news for water managers. This latest report marks the 19th year that phosphorus reduction has exceeded annual targets.

SFWMD officials said that over the last two decades there has been a 55 percent reduction in phosphorous flowing into the Everglades. That translates into 2,854 metric tons that were kept from the Everglades.

The C-139 basin west of the EAA also showed a favorable trend by blocking 28 metric tons from flowing south.

But environmental interests are skeptical of the new report.

"Their baseline is extraordinarily low so it makes it a lot easier (for mandated reductions) to be met," said Eric Draper, executive director of Audubon Florida. He said that the district is recycling old data so it really does not paint an accurate picture of progress made.

GLADES
Continued on Page 16

FRC 2014

From Page 10

browser-based web application," said Andy Levy, Promium's director of marketing. "The user interface is very intuitive and companies do not need to purchase or install any other software."

Using such approaches may be a real boon to businesses of any size that handle chain-of-custody forms.

The role of environmental policy has been the fabric base of the environmental remediation tapestry, even before there was a technology-based enterprise. FRC has always arranged panel discussions to give attendees and regulatory agency staff a chance to communicate one on one. And if attendance is any indication, these panel discussions are the most valuable sessions of the conference.

This year, Valerie Huegel, administrator of the Florida Department of Environmental Protection's Petroleum Restoration Program, will lead a group of DEP colleagues at a regulatory panel discussion moderated by Glenn MacGraw, vice president with The FGS Group in Tallahassee.

The petroleum program, one of the mainstays for funding and standards for the protection and cleanup of Florida's groundwater and soils, has been through a prolonged reform process that is now, hopefully, nearing completion.

In addition to updating FRC participants on program policy matters, this panel features a nuts-and-bolts discussion of petroleum program e-quoting as well as invoicing—two areas of significant con-

nation for remediation practitioners. A second panel discussion focuses on reducing post-closure monitoring at solid waste facilities. For years, a 30-year monitoring program has been part and parcel of any landfill closure and a major expense to the owner of the landfill.

Recently, landfill owners within the bounds of DEP's Northeast District have petitioned for reductions in monitoring requirements. DEP has granted such requests for 36 of 42 permit holders. Cost savings for post-closure monitoring have amounted to at least \$3.6 million.

Across the state, the possibilities for additional reductions could be very significant to local governments.

FRC Chair Nick Albergo, PE, DEE, now a senior engineer with Conestoga-Rovers & Associates in Tampa, has been integrally involved with the conference's direction since its inception.

This year, he will kick off the conference with a presentation on global hunger, a subject he has experienced first-hand in his travels across the globe.

Albergo characterized the significance of FRC's 20-year anniversary as another scenario of the conference.

"FRC was born with the goal of breaking allegiance with the past and its systems that were familiar to all and instead 'boldly go where no man has gone before,'" said Albergo.

That same theme will again highlight the conference and provide participants with a lot to think about in the coming months.

Injection well depth significant issue at new Keys wastewater plant

By DAN MILLOTT

Officials with the Florida Keys Aqueduct Authority and local environmental activists don't agree on much, but they are on the same page about one thing: injection wells are needed at the new Cudjoe Regional Wastewater Plant.

However, their visions for the injection wells differ significantly.

FKAA believes that 120 feet deep is plenty for the wells they are planning, but groups like Dig Deep Cudjoe, Last Stand and Reef Relief are pushing for deep injection wells that would penetrate the rock zone 2,000 feet below the surface.

This depth difference puts the authority and environmental groups in different ball parks price-wise. FKAA has approved \$800,000 for the four wells at Cudjoe but if they went the deep well route, it would cost upwards of \$6-\$8 million.

The \$170-million Cudjoe Key project, due to be completed next year, is the most expensive of the numerous wastewater treatment projects constructed in the Keys dating back to 1979 when Key West was mandated to build a plant.

The old method of disposing of wastewater treatment plant effluent was to discharge it through ocean outfalls and let nature take care of it.

But the construction of new ocean outfalls has not been allowed by the state since 2010. Plus, a timeline has been set

for eliminating existing domestic wastewater ocean outfalls by 2025.

FKAA Executive Director Kirk Zuelch and Tom Walker, manager of engineering for the authority, said the agency is following Florida Department of Environmental Protection guidelines with their approach.

The DEP said that if the daily flow of treated sewage is less than one million gallons a day, deeper injection wells aren't required. Estimates for the flow from Cudjoe are pegged by FKAA at 940,000 million gallons per day.

But Naja Girard, president of Last Stand, disputes the FKAA estimate of the daily outflow. She said that by 2016 when Cudjoe is fully operational with all hook-ups, the outflow will easily surpass the one mgd limit.

Zuelch noted that the authority will install monitor wells for each of the four injection wells that will act as a check to make sure the outflow does not exceed the maximum allowed.

Last Stand has sent a letter to the Miami-Dade County Commission, the Florida Department of Environmental Protection and FKAA citing state regulations, insufficient treatment of effluent and harm to sea life, urging them to find funding for the deep wells.

Girard suggested that the authority use a portion of the tourist tax as a source for funding deeper wells. Walker agreed that the tax could be a funding source, but said

that money has been going to several wastewater treatment plants the county has built since the voters signed off on earmarking tourist tax money.

Deep Cudjoe, another group advocating deeper wells, noted that outflow from shallow wells can cause long term damage to near-shore waters. The increased levels of nitrogen and phosphorous can cause algae blooms and ultimately harm marine life.

While Cudjoe officials plan to make use of the shallower wells, deep water wells have been drilled at Key West and Key Largo. The wells are drilled deep into the rock zone and direct the outflow 15-30 miles out to sea.

FKAA believes the Cudjoe plant will help solve some problems because it will eliminate septic tanks and cesspits now in use that contribute to pollution in near-shore waters.

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Institute picks up where DEP left off with Wakulla Springs restoration plan

By PRAKASH GANDHI

The Gainesville-based Howard T. Odum Florida Springs Institute released a report detailing a restoration plan for Wakulla Springs in North Florida.

The 130-page document compiles the latest information on the spring's current condition as well as the threats it faces.

The institute's plan expands on work conducted before and after the Florida Department of Environmental Protection canceled its funding after just one year of the planned three-year project.

Similar restoration efforts at three other Florida springs also were discontinued due to legislative budget cuts.

Wakulla Springs is located south of Tallahassee in Wakulla County. It forms the Wakulla River that flows nine miles to the southeast where it joins the St. Marks River.

The spring system has 32 underwater caves and serves a large manatee population. It was dubbed a National Natural Landmark in 1977 and is one of the deepest freshwater springs in the world.

But it has been heavily impacted by urban development in Tallahassee and rural development in surrounding areas. The nitrate level in the water is elevated and the water clarity has decreased.

Tallahassee's Southeast Farm Wastewater Reuse Facility has been identified as the principal source of the nitrate in groundwater flowing to the spring.

Fertilizer use and thousands of septic tanks in Wakulla and Leon counties are also sources of nitrates, said Bob Knight, executive director of the Florida Springs Institute.

Officials said the frequency and intensity of darker water has increased dramatically over the past 30 years.

Invasive aquatic vegetation is also a problem, Knight said. The system has been invaded by hydrilla, an exotic aquatic plant that can rapidly spread. Efforts to control invasives using herbicides have reduced, but not eliminated, the exotic infestation.

The restoration plan calls for an end to fertilizer use, mandatory water conservation, increased monitoring and shortened time frames for setting and meeting state-required pollution and pumping limits.

The city of Tallahassee has spent \$225 million upgrading its wastewater plant to remove nitrogen harming the spring.

"The project should cut the nitrate levels in half and that's a very significant step," Knight said. "But there are still a lot of fertilizer and septic tanks that are affecting Wakulla."

Officials need to cut back on groundwater pumping, limit the use of urban and agricultural fertilizer and reduce dependence on septic tanks in the springshed, Knight said. "There is a need to reduce fertilizer use by half in the basin and the number of septic tanks should also be reduced by half."

"This report is a blueprint for the restoration of Wakulla Springs. It's vitally important that we improve the condition of the spring. It has great historical, cultural and ecological significance," he said.

New state water quality standards require a 56 percent cut in the amount of nitrate entering the groundwater from sewer systems, septic tanks and fertilizer run off.

Many spring advocates believe that the basin management plans being put in place will not produce results fast enough.

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Vero Beach officials seek state approval for alternative to septic tanks

By PRAKASH GANDHI

Officials with the city of Vero Beach are hoping to reduce pollution entering the problem-plagued Indian River Lagoon by embarking on a pilot project involving the city's septic tank systems.

Officials say there is mounting scientific evidence that points to septic tank seepage as a major source of pollution in the IRL.

Septic tank effluent floods the lagoon with nitrogen that feeds algae blooms and kills marine life. Outdated and leaking tanks also contaminate the waterway with bacteria and household chemicals.

The closer septic tanks are to surface water and to the lagoon, the more likely they are to be polluting the fragile estuary.

In response, the city wants to introduce a system called STEP—a modified com-

posed Septic Tank Effluent Pump system.

STEP is only half as expensive as standard sewer installation. It leaves existing septic systems in place as a backup while capturing household effluent before it goes into the ground.

"Septic tanks have been the focus of discussion for many years. It is one of the most expensive things to correct. As soon as the discussion comes up and people talk about the price tag for fixing the problem, politicians seem to run and hide."

Rob Bolton, Director

City of Vero Beach Water and Sewer Administration Division

The effluent is pumped into the city's existing sewer system for treatment via a series of small diameter pipes that can be installed without tearing up streets or trenching yards.

Rob Bolton, director of the city Water and Sewer Administration Division, said he would meet with officials with the Florida Department of Environmental Pro-

tection and apply for a permit for a pilot project involving about 140 homes in Vero Beach.

"We will leave the existing septic tank system in place, tap into the effluent and pump it into the sewer plant where it will

be treated," Bolton said. "The (treated) effluent can then be reused for irrigation purposes."

Bolton said the primary benefit of the STEP system is that it prevents septic tank effluent from getting into the groundwater and ending up in the lagoon.

"This system will decrease the amount of nitrogen and phosphorus going into the lagoon," he said.

Many of the 900 septic tanks within the city were installed prior to the adoption of more stringent regulations. The stricter standards were adopted in the early 1980s requiring more separation from the lagoon and from the water table.

"A lot of the older areas of Vero Beach and the county have septic tanks that were built prior to new rules going into effect," Bolton said.

Indian River County has more than 31,000 septic tanks, and the Indian River Lagoon basin has more than 300,000 systems in place.

Dealing with the nutrient pollution from septic tanks has been an uphill battle.

"Septic tanks have been the focus of discussion for many years," Bolton said. "It is one of the most expensive things to correct. As soon as the discussion comes up and people talk about the price tag for fixing the problem, politicians seem to run and hide."

He said that the advantage of the STEP program is that it costs roughly half of a conventional gravity sewer system.

"The upfront costs of tearing up the roads and putting in sewer lines is also roughly one-tenth to one-fifteenth of a conventional gravity sewer system," Bolton said. "In addition, there are environmental benefits. You remove more than 90 percent of the effluent going into the groundwater."

The city likely has the power to impose the sewer work on neighborhoods but officials said they would probably seek resident input before moving forward. Bolton said he hopes everybody on septic tanks in the city will be connected to the STEP system within 10 years.

State officials have said they will consider hybrid septic systems despite a law that states that drainfields must be abandoned if septic tanks are hooked to sewer lines. DEP said it will weigh applications on a case-by-case basis.

Some officials have proposed making it possible for all properties near canals and the lagoon to connect to sanitary sewer service within five years.

The cities of Stuart and Sarasota have both begun similar programs to expand their sewer service to reduce septic tank pollution of their near-shore waters.

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New tool to lessen impact of crop drought

BY BLANCHE HARDY, PG

Scientists with the University of Florida's Institute of Food and Agricultural Sciences have created a decision support tool called Agricultural Reference Index for Drought, ARID for short, that can help lessen the impact of crop-destroying drought.

The data currently loaded in ARID can predict drought levels for crops on farms in Florida and Georgia.

With expansion of the current data set, ARID could become a viable tool for both small and large agribusiness interests.

"It can be used to compute agricultural droughts and their effects on yield that will be useful for (crop planning) and decisions about land use, for example," said Jim Jones, PhD, a top IFAS climate-science expert.

ARID is a simple and reliable index to monitor and predict agricultural drought, allowing farmers to plant at the most favorable times and help reduce the economic impact of drought.

According to the U.S. Department of Agriculture, crop loss due to drought can cost farmers millions of dollars in any given year.

USDA Risk Management Agency records indicate that drought was the predominant source of crop insurance indemnities paid between 1999 and 2009, totaling in excess of \$15 billion.

In 2012, the estimated cost of drought-related crop damage was \$20 billion.

IFAS documentation indicates agricultural drought indices are typically developed to monitor crop water stress. The ARID tool expands on this and takes into account soil-plant-atmosphere relationships.

It is designed to both quantify crop water stress at a particular time and to estimate crop yield loss due to drought which, IFAS observes, is what farmers are ultimately interested in.

It can be used to help farmers decide to plant a crop earlier or later than is typical, so drought is less likely to occur when the crop is most vulnerable to drought stress.

Actively growing grass was utilized by IFAS scientists as ARID's reference crop with a soil water balance for a soil profile assumed to be 16 inches deep with evenly

distributed roots.

To support the tool, data such as daily rainfall, temperature, sunlight, wind speed and humidity are collected, potential-versus-actual evaporation by plants is determined, and the volume of soil water is then calculated daily based on how much water is added to the system and how much water is lost.

A plant water deficit occurs when there is insufficient water in the soil profile to meet the plants' needs. When roots can't recover enough water from the soil to replace evaporated water, plants experience stress.

The ARID tool is loaded and operational for agricultural and public use at AgroClimate's web site, AgroClimate.org, a web-resource of tools and data on climate and crops.

The site hosts a number of public resources to assist in the management of agricultural systems throughout the Southeast U.S.

The ARID tool is user friendly and allows users to enter a zip code to access county data or select a specific individual agricultural station location that, when clicked, provides the average ARID index.

Site data can be accessed by corresponding tabs to display both graphed current daily collected ARID data and corresponding tabular data, plus the average data deviation and monthly percent probability exceedance.

Jones noted that ARID is already being used in several research projects. Currently, ARID is limited to Florida and Georgia, but is in the process of being expanded and tweaked.

"We are working on more complete models of cropping systems for corn, peanuts, cotton, soybeans, tomatoes, potatoes, and other crops that include more complete information about drought and impacts of temperature and CO2 concentrations," he said. "But, that is really another story, and still mostly in a research mode."

"However, these more complete models are being used to analyze the impacts of climate change on crop yield, taking into account drought similar to ARID but also to changes in temperature, CO2, and other management information. The University of Florida team involved with ARID is playing a key role in these tools and analyses for use in the U.S. and globally."

BROWNFIELDS

From Page 1

BSRA's has varied between a low of 12 in 2011 and highs of 17 in 2008 and 2012.

Five site rehabilitation completion orders have been logged in the first half of 2014. This is in line with numbers from the past four years.

Since 2008, the totals have varied between four and 11 SRCOs per year. SRCO totals reflect the end of remediation efforts in progress for several years before completion orders were granted.

The brownfield program includes a provision for voluntary cleanup tax credits. Both brownfield sites and dry-cleaning solvent-contaminated sites are eligible

FEDFILE

From Page 2

Dichloromethane risk. The EPA recently reported that dichloromethane, a solvent widely used in paint stripping products, poses health risks for workers, consumers and bystanders in workplaces and homes where the chemical is used.

More than 230,000 workers nationwide are exposed to DCM released from paint strippers.

This risk assessment was done under a Toxic Substances Control Act work plan.

The agency will now consider possible voluntary and regulatory actions that could reduce exposure risks. That will begin with a late fall workshop to involve stakeholders and the public on potential alternatives and risk reduction approaches.

The EPA urges consumers to take precautions to reduce exposure to DCM or methylene chloride, another active ingredient in paint strippers.

The EPA released a separate draft report evaluating the potential risks of another chemical frequently used in paint strippers, N-Methylpyrrolidone. That draft identified similar risks for NMP.

Marine sanctuary management. The Florida Keys National Marine Sanctuary Advisory Council approved a set of recommendations for updating management of the nearly 3,000-square-mile marine sanctuary.

The nonbinding recommendations to sanctuary managers and staff included suggestions to: evaluate the use of user fees to support resource management; determine whether areas "closed to all users" would hinder research and invasive species removal; consider allowing pole spear fishing in existing areas to help reduce the lionfish population; evaluate voluntary boater education programs based on the Everglades EcoMariner Program; and consider declaring some protected areas as no-anchor zones where the use of permanent mooring balls or boat tie-offs will be required.

A recommendation to update the sanctuary's marine zoning plan is likely to be the most contentious issue.

The council unanimously approved the inclusion of a proposal to consider the establishment of large "no-take reserves" that consist of contiguous, diverse and interconnected habitats. They could be as large as 25 square miles.

The sanctuary has only two ecological reserves now delineated, one at the Dry Tortugas and the other around Western Sambo in the Lower Keys.

The council is submitting a series of recommendations that may be incorporated into that updated sanctuary management plan expected to be issued in 2015. Recommendations advanced recently are only part of those being considered.

During an October meeting, the council will consider recommendations for artificial reefs and habitats, conflicts between shallow water boating and fishing, water quality and perhaps a South Florida fishery management area.

That meeting is open to the public and public comment may be taken.

BP guilty of negligence. U.S. District Court Judge Carl Barbier ruled that BP responsibility for the disastrous 2010 Gulf of Mexico oil spill was the result of gross negligence.

Judge Barbier based his decision on instances of negligence, extreme deviation

for the credits.

The tax credit is 50 percent of the cost of voluntary cleanup activity integral to site rehabilitation—up to \$500,000 per site per year.

DEP received 80 VCTC applications for calendar year 2013. With respect to brownfields, 67 of the 80 applications were for voluntary cleanups and waste removal in brownfield areas.

The total cost of brownfield credits was \$6,645,689. Tax credit totals for brownfields increased by approximately \$1 million between 2012 and 2013.

The value of tax credits for voluntary cleanup of sites does not reflect the recent drop in the number of sites. In its report,

from standards of care and conscious disregard of known risks.

In 2011, Judge Barbier ruled that BP bore 67 percent of the responsibility for the blowout, and business partners Transocean Ltd. and Haliburton were responsible for 30 and three percent, respectively. The percentage ruling in that case involved financial responsibility in a civil case.

Judge Barbier's rulings in these two cases will have major influence on financial costs to BP.

The Clean Water Act allows substantial increases in fines and penalties under circumstances of gross negligence. For BP, that could translate to an additional \$18 billion in penalties, above the billions in

DEP projects similar tax credit amounts in 2014 as those in 2013.

A bill passed by the 2013 Florida Legislature, CB/SB 406, established a job bonus refund beginning July 1, 2013. No refund amounts were reported, as this is the end of the first year of eligibility but the report includes estimates of new jobs and investment.

"The metrics are disappointing," said Michael Goldstein, managing shareholder with The Goldstein Environmental Law Firm in Miami, commenting on the decline. "But results were predictable that the legislation was going to have a chilling effect on the redevelopment and capital community because the legislation 'skin-

criminal fines and compensation the company has already paid.

The finding could raise the civil penalty from a \$1100 to \$4300 per barrel of spilled oil. Although a three-week hearing occurred in Judge Barbier's court, he has yet to rule on the amount of spilled oil.

Government witnesses testified that 4.2 million barrels were spilled while BP argued that the judge should use the number of 2.45 million barrels.

The judge's decisions on the amount of oil spilled and the fine per barrel will be part of the calculation of BP's financial liability under the Clean Water Act.

Immediately after the decision was announced, BP announced it would appeal.

nied down' the availability of incentives."

But Goldstein noted that the news is not all bad for brownfield redevelopment. "DEP has done some phenomenal things to facilitate development," he said.

He cited recent liability clarification and additional tools to develop risk assessments and facilitate remediation, beneficial administrative opinions for different types of contaminants at brownfield sites and the streamlining of the state Petroleum Restoration Program.

"The cultural shift is being led by Jorge Caspary (director of the DEP's Waste Management Division)," he said.

The future may bring a stand-alone voluntary cleanup tax credit for brownfield sites that is now being promoted by several organizations active in brownfield redevelopment.

"One door has closed, but other doors seem to be opening through administrative additions and reform," said Goldstein about the current flux in the program.

Recent numbers for new brownfield designations and rehabilitation agreements, if they persist, will put a significant dent in local governments' opportunities to return contaminated land to beneficial use.

But brownfield program supporters have never wavered in their endorsement of the program's benefits. In the end, property owners and lenders must also share that enthusiasm.

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TRADING

From Page 1

paying for their extra work rather than fulfilling its entire obligation.

The river got the total required level of pollutant reduction and it happened faster.

One of the major benefits of the trading program, Miller said, is that it allows facilities facing higher pollution control costs to meet their regulatory obligations by buying environmentally equivalent—or superior—reductions from another source at a lower cost.

This helps to achieve the same water quality improvement at a lower overall cost.

“Water quality credit trading is more effective in areas where a quantified restoration goal has been developed such as a total maximum daily load,” Miller said. “These restoration goals identify the pollutant reductions necessary to restore a waterbody to health and provide the measuring stick to determine if stakeholders have credits available.”

The TMDL typically identifies pollutant loadings, watershed conditions and the maximum level of pollutants that may be present for a waterbody to still be considered healthy.

“All of this information is necessary for effective trading,” Miller said.



Photo courtesy of Suwannee River Water Management District

Recently, the Suwannee River Water Management District introduced dye into two sinks in southeast Lafayette County. The results, depicted above, demonstrated how quickly water moves through the Upper Floridan aquifer.

GLADES

From Page 12

Farming interests applauded the report. They said that the EAA is the only significant agricultural watershed in the country that must comply with phosphorous mandates. Under current requirements, each farm in the EAA must measure and report annual rainfall, the volume of water leav-

ing each farm and the phosphorous concentration in the water.

Within the EAA, the district established massive stormwater treatment areas. The five man-made filter marshes cover 57,000 acres.

The district said the marshes retained 81 percent of the phosphorus from the 1.3 million acre-feet that flow through them.

PEER

From Page 5

latory programs are at an all-time high of 96 percent. That can be attributed to an uptick in outreach efforts to businesses.

“In 2013 alone, DEP participated in more than 5,800 events in an effort to increase compliance rates, resulting in greater environmental protection. DEP’s focus is preventing environmental harm before it occurs. As a result of DEP’s proactive education and outreach efforts, the number of facilities in significant compliance with DEP’s rules and regulations rose nearly six percent from 90.1 percent in 2011 to 96 percent in 2013.”

PEER’s August news release indicated that as many as 46 facilities have been in noncompliance for more than seven years, 113 facilities have been listed 11 times in the past 14 years. Enforcement action was taken in less than 49 percent of the instances of violations.

Ruch expressed significant concern that the loss of revenue from fines levied against “chronic violators” and used to fund beach and wetlands restorations, waste cleanup and pollution abatement programs will result in funding shortages and a shift from “the polluter pays” to “the taxpayer pays.”

NOTES

From Page 3

ous materials.

Officials have been trying to get the site cleaned up for more than five years, working with an unresponsive prior owner.

Fort Lauderdale businessman Jesse Gaddis acquired the property in 2012 through a foreclosure action along with other properties that had been put up as collateral in a business deal.

In December, Indian River County’s Environmental Control Board imposed a \$42,500 fine on Gaddis for failure to clean up the health hazard located next to Gifford Park, which contains ball fields, playgrounds and a swimming pool frequented by children.

Much of the cleanup effort was spearheaded by Indian River County developer Joseph Paladin.

The work cost about \$100,000. The board later reduced the fine to \$15,000.

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