Florida Specifier

Happy Holidays, One and All!

Practical Information For Environmental Professionals

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Photo courtesy of U.S. Army Corps of Engineers

In October, the U.S. Army Corps of Engineers began Increment 1 of the G-3273 and S-356 pump station tests to increase water deliveries to Northeast Shark River Slough in Everglades National Park. The tests are incremental water operations field tests that will move relatively low water volumes. Shown above is the field test of the S-356 Pump Station.

Environmental indicators point to potential toxic algae bloom in Florida Bay

By BLANCHE HARDY, PG

Serious ruin may again be brewing in Florida Bay. The bay has suffered a significant loss of seagrass acreage this year—an estimated 3,000-5,000 acres of seagrass in Rankin Lake and Johnson Key basin, and maybe more.

The dead seagrass stinks but, more importantly, serves as a strong indicator of a potential toxic algae bloom. South Florida Water Management District scientists have also noted rising chlorophyll levels in the shallow waters where seagrass has died.

"Surveys are on-going to determine the overall loss of seagrass," said Randy Smith, a spokesperson with the South Florida Water Management District. "Testing around the Seven Palm area showed high chlorophyll readings that indicate conditions are right for an algal bloom to develop."

Once these bloom events start, there is no stopping them. The last time this happened in 1987, the algae bloom took a couple of years to erupt. It devastated the bay for the following 20 years.

The 76-mile-long Tamiami Trail, originally designed to act as a dam allowing the southern Everglades to be drained, is regularly pointed to by environmental advocates as one of the primary culprits behind events such as the seagrass die-off in the bay.

Considered a wonder of engineering when built, the trail bisects the Everglades, significantly interrupting the natural flow of water from the Kissimmee River and Lake Okeechobee through the "Sea of Grass" and into Florida Bay.

As with all ecosystems along Florida's coast, its health is a matter of fresh and salt water balance.

The damming effect of the roadway allows saltwater to intrude into the marshlands, and reduces the volume of fresh water available to minimize the impact of agricultural and municipal pollutant runoff. The result is habitat loss and seagrass die off.

"Several major projects are underway to get more fresh water into Florida Bay through Taylor Slough, said Smith. "These include the Modified Water Deliveries Projects that elevated the Tamiami Trail with a one-mile bridge allowing water to flow in using the S-356 pump station."

The trail bridge is among the first steps taken to reopen surface water

GLADES
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PRP accepting applications for Advanced Cleanup Program

By ROY LAUGHLIN

The Florida Department of Environmental Protection's Advanced Cleanup Program is accepting applications for the funding of petroleum cleanup projects. The Petroleum Restoration Program has allocated up to $10 million to fund the projects.

The AC program targets owners and responsible parties of sites who wish to cleanup their sites quickly, but who do not immediately qualify for PRP funding due to low priority within the program's rankings.

The AC program application requirements include a $250 nonrefundable fee. More importantly, it requires a 25 percent minimum cost share from owners for eligible Early Detection Incentive Program, Petroleum Liability and Restoration Insurance Program and Abandoned Tank Restoration Program sites.

The exception is for sites in the Petroleum Cleanup Participation Program, which requires a 50 percent cost share of total cleanup costs.

The AC program today is similar to the former Preapproved Advanced Cleanup Program, a component of the state's petroleum cleanup program prior to its reform. By contributing a 25 percent cost share, property owners could initiate early cleanup, as is the case now.

DEP Press Secretary Lori Elliott further noted that under current AC and PRP practices, the owner may choose the contractor, or the contractor will be selected under the PRP's current contractor-selection process.

"Bundling" is another notable AC characteristic. An owner with multiple sites, for example a chain of service stations, may submit a proposal to cleanup several sites under AC funding.

One of the recently funded applications included 20 sites and the funding amounted to several million dollars in total.

To be clear, PRP may bundle sites

PETROLEUM
Continued on Page 16

EPA blasts Sabal Trail pipeline's draft environmental impact statement

Staff report

In early October, it appeared as though plans to build the 526-mile-long Sabal Trail interstate natural gas pipeline were on a fast track for approval by the Federal Energy Regulatory Commission.

But on the last day for comment, the U.S. Environmental Protection Agency submitted a 30-page criticism of the pipeline's draft environmental impact statement.

The proposed gas pipeline would span three states including 13 Florida counties and terminate at a proposed compressor plant in Osceola County. From that plant, the existing Florida Gas Transmission Pipeline would carry the gas to FPL plants near Indiantown in Martin County, and to power generation plants in Riviera Beach and Hollywood.

Currently, FPL generates 68 percent of its electricity using natural gas.

The EPA found much to criticize in FERC's 2,000-page draft environmental impact statement. The agency noted that the pipeline would pass through 1,255 acres of wetlands and 177 acres of conservation areas including some in Florida's ecologically sensitive Green Swamp area.

In addition, in areas of Southwest Georgia and Florida, the Karst topography may be a factor not adequately addressed for potential damage to ground and surface waters.

The Karst topography, particularly in North and Central Florida, was a particular focus of EPA's comments. They noted that the proposed route passes through some of the most vulnerable segments of the Floridan Aquifer.

The pipeline would be buried below the Lower Santa Fe and Suwannee rivers, and in dozens of springsheds along the way. It will also cross other existing pipelines.

The agency noted that the loss of drilling mud—where horizontal drilling occurs during pipeline installation—could affect both water quality and water flow in the aquifer, and associated rivers and springs.

The agency provided an estimate of 3,750 known or potential Karst features including sinkholes and underground caverns within a quarter mile of the proposed pipeline route. They criticized the draft environmental impact statement's characterization of an "unlikelihood for sinkhole development."

The EPA also questioned the selection of the Sabal Trail Pipeline's route as the preferred route. That route was designated in an enforceable contract between Sabal Trail and FPL in late June, 2013, before environmental studies were completed.

There could be financial impacts to Sabal Trail if contractual deadlines are not met. That could have influenced the FERC process, which led to the adoption of the current route to the exclusion of others that might have less effect on the environment and communities along the way.

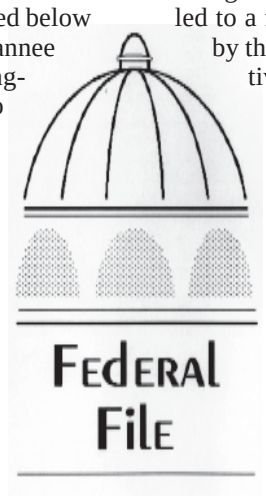
EPA noted that FERC accepted Sable Trail's 2014 application to begin a prefiling process before it had consulted with the Florida and Georgia geological societies, the Suwannee River Water Management District, the Florida Department of Environmental Protection and the EPA. Such prior consultation is required by the National Environmental Policy Act.

In its formal response, the EPA asked FERC to develop "meaningful environmental metrics" that will allow it to conduct a more thorough investigation and a comparison of other routes—and even alternative methods of delivering natural gas.

The public comment period on the draft environmental impact statement closed in late October. FERC will evaluate public comment before its five members decide whether to vote on it or forward it to an administrative law judge for additional hearings.

In Florida, administrative hearings related to the pipeline are already in the works. DEP announced its intent to issue an environmental resource permit for the pipeline and grant easements to use sovereign submerged lands.

The WWALS Watershed Coalition challenged that decision on Aug. 28, which led to a formal hearing in late October by the state Division of Administrative Hearings. The judge's decision is now pending.



Agreement on fertilizer waste. In early October, the EPA, the U.S. Department of Justice and Mosaic Fertilizer LLC inked an agreement that commits the fertilizer company to spend almost $2 billion to deal with fertilizer processing wastes in Louisiana and Florida.

The agreement covers eight facilities, six of them in Florida.

The consent agreement follows almost eight years of negotiations over a series of alleged violations of the federal Resource Conservation and Recovery Act arising from Mosaic's storage of phosphogypsum mining wastes and the storage and handling of acidic wastewater, an end product of phosphate extraction.

The EPA views the wastewater in particular as a severe threat to drinking water sources and human health if it escapes confinement.

Alleged violations included improper storage and disposal of phosphoric and sulfuric acid production wastes in Bartow, Lithia, Mulberry and Riverview, FL, and the two plants in Louisiana.

The EPA also alleged that Mosaic failed to properly treat, store and dispose of hazardous wastes, and failed to provide adequate financial assurance for facility closures.

The agreement requires Mosaic to establish a $630 million trust fund to be invested until it reaches a total of $1.8 billion. The trust fund will cover future closures and the treatment of hazardous wastewater at four Mosaic facilities operating in Bartow, New Wales and Riverview plants in Florida.

It will also cover long-term operation and maintenance at three additional facilities already undergoing closure. Mosaic will provide financial guarantees for the closure work along with submission of a $50 million letter of credit.

The fertilizer company will also spend $170 million to reduce the environmental effects of mining and waste management at all of its facilities, including reducing the storage volumes of hazardous acidic wastewater, installing environmentally-protective barriers around and under waste piles and storage ponds, and verifying the structural integrity of those piles and ponds.

Some of the measures will directly benefit Mosaic by optimizing resource efficiency and decreasing the amount of raw materials required to produce fertilizer.

The settlement garners an additional $2.2 million for two local environmental projects, one of those in Mulberry where Mosaic will spend $1.2 million to mitigate and prevent potential environmental impacts at an orphaned industrial property there.

It will also pay a $5 million civil penalty to the U.S., $1.55 million to the state of Louisiana and $1.45 million to the state of Florida. The two states were plaintiffs with the EPA in the case against Mosaic Fertilizer.

The consent agreement was lodged on Oct. 1 in the U.S. District Courts for the Middle District of Florida and the Eastern District of Louisiana. Florida's 30-day public comment period ended Oct. 30.

FEDFILE

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UCS study: Rapid transition to natural gas for power generation has potential downsides

Staff report

Florida is at high risk of an over dependence on natural gas, according to a new study. The report from the Union of Concerned Scientists found that Florida uses natural gas for over 60 percent of its in-state electricity generation.

The report noted the rapid transition from using coal to using natural gas in recent years.

Natural gas can reduce electric costs to consumers and cut down on carbon pollution. But relying on natural gas too much can be problematic, the report said.

Natural gas prices are volatile and can hit consumers hard during price spikes, the study found.

In addition, using too much natural gas increases carbon emissions that contribute to global warming.

Within two years, the state of Florida will have the third-highest electric capacity nationwide.

Duke solar plants. Duke Energy plans to open a new 3.8-megawatt solar facility on Canoe Creek Road near St. Cloud in Osceola County. The plant is expected to be on on-line sometime next year.

Duke filed stormwater and environmental resource permits with the Florida Department of Environmental Protection and has applied for other permits as well.

Construction of the Osceola Star plant will start once permits are approved. The facility will be built on 17 acres of a larger 25-acre parcel on Canoe Creek Road.

Earlier this year, the company received approval to build, own and operate a 5-megawatt solar facility to serve the Reedy Creek Improvement District near Orlando.

Duke Energy also announced plans for another solar plant in Perry in the Florida Panhandle.

The company plans to invest about $3 billion in renewable energy projects over the next five years. They plan to install 35 megawatts of solar power by 2018 and up to 500 megawatts by 2024.

North of the border CTS plant. Renewable Resources Development of America LLC has secured a site for what will be their inaugural commercial "cellulose to sugar" plant in Vidalia, GA.

The plant will process up to 1,000 metric tons a day of mixed feedstock.

The company is working with local farmers to process sweet onion, and pine tree and paper mill process waste into fermentable sugars to be sold through an agreement already in place.

Landfill makeover. Officials are working to transform a former landfill in Gainesville into a site that will help prevent erosion and keep waste out of the floodplain and Little Hatchet Creek. Work on the $1.88 million project started in April.

The area was used in the 1960s and early 1970s to dispose of garbage and for storage of other materials. Officials said there was some contamination from the materials that were in the landfill.

Remediation work on the landfill, which is near the Gainesville Regional Airport, is being handled by the Gainesville Public Works Department and Tampa-based EnviroTek, now part of Action Environmental.

During the project, water will be channeled into the wetlands and nearby Little Hatchet Creek without causing further erosion.

Sabal Trail petition. A Georgia-based environmental group, WWALS Watershed Coalition Inc., has filed a petition against the Florida Department of Environmental Protection for issuing a permit for the Sabal Trail natural gas pipeline.

The Florida stretch of the proposed pipeline includes 232.75 miles of 36-inch diameter mainline and about 21.5 miles of 24-inch pipeline for the Citrus County section.

The coalition believes that the project is not in the public interest. Coalition advocates are concerned about whether the applicant can safely install a 36-inch pipeline in the sensitive Karst terrain of northern Central Florida and under some designated Outstanding Florida Waters without causing serious damage.

Coalition officials want DEP to deny the permit or stop construction through the Karst terrain.

Florida Notes

People news. Chad Northington, PE, joined Regenesis as their Southeast District technical manager. He has 15 plus years of industry experience as an environmental engineer and project manager, doing remediation system design and installation, site investigation and technical assistance. He earned his bachelors and masters degrees in environmental engineering from Michigan Technological University.

Ryan Matthews was named as the new director of the Florida Department of Environmental Protection's Office of Water Policy. Matthews will be responsible for overseeing the coordination and implementation of Florida's statewide water policies.

Most recently, he served as assistant general counsel and associate director of legislative affairs for the Florida League of Cities.

Keith Wilkins, former Escambia County director of natural resources management, was named as the city of Pensacola's assistant city administrator.

Prior to that, he served as director of the county's Community and Environment Department.

John Horvath, PE, was appointed the utilities department manager for Jones Edmunds' Gainesville office. Horvath has been with Jones Edmunds for 27 years, serving as project manager, QC engineer, project engineer and lead design engineer.

In addition, Frank Miller, PE, joined the firm's Winter Haven office as project manager. He brings more than 18 years of engineering and project management experience to the company.

DEP gives Cudjoe Key wastewater treatment plant green light to operate

Staff report

The Cudjoe Regional Wastewater System treatment plant received final approval from the Florida Department of Environmental Regulation to begin full operation in October.

By mid-November, businesses and homeowners in designated areas served by the plant must begin using it or will be treated as delinquent in meeting mandatory hookup requirements. Residents and businesses in other areas have another year to hook up to the central sewage system.

Eventually, the Cudjoe Regional Wastewater System will serve 9,000 customers in the Florida Keys from Cudjoe Key through Big Pine Key. Construction so far has cost about $187 million and taken about three years.

The changeover to the central system is controversial because homeowners must supply electricity to pumps and grinders as the wastewater leaves their property. That equipment will not operate in the event of a power outage, and homeowners could be without sewer service for prolonged periods during power outages.

Initially, treated wastewater will be disposed of via shallow injection wells, just 120 feet deep. Some customers wanted officials to build a 2,000-feet-deep injection well at a cost of $7.1 million before beginning full treatment operation.

In approving the permit to operate, DEP found no objection to using the shallow wells during the year that it is expected to take to complete the deep well. Apparently ending the use of septic tanks and cesspools, the goal of local authorities and utility managers, was seen as more advantageous than delaying wastewater treatment until the deep disposal well was finished.

THE WATER WATCH

Zero discharge to the St. Johns. With the completion of two miles of wastewater pipeline by the city of Jacksonville, the Naval Air Station Jacksonville's wastewater treatment plant became the first plant with zero discharge to the St. John's River.

The Navy base has been working with city officials to reduce groundwater withdrawals and wastewater discharges into the St. Johns River since 1998.

In the first phase, NAS Jax sent wastewater to the Timuquana Country Club's Golf Course for irrigation.

Then in 2007, NAS Jax began working with the city to obtain funding from the U.S. Department of Defense and the St. Johns River Water Management District and, in 2012, extended water reuse lines to NAS Jax's own golf course.

Finally in October this year, the final two miles of piping to carry the water to the wastewater spray field was completed.

The new reuse system will eliminate the withdrawal of 73 million gallons of groundwater annually. It will also end the discharge of as much as much as 315 million gallons of treated wastewater to the St. John's River annually.

It will also save $200,000 in annual fees for potable water and reduce the use of fertilizer on golf courses receiving the reuse water.

Springs restoration projects. Six spring restoration projects in Bay, Jackson and Wakulla counties in Florida's Panhandle will receive funding from DEP and the Northwest Florida Water Management District.

DEP will provide $11.6 million for the work and the projects are expected to receive over $6.2 million in matching funds. Work is slated for Gainer Springs, Jackson Blue Spring and Wakulla Springs.

The springs projects were selected based on the need for pollutant reduction, water conservation, cost-effectiveness and available matching funds.

Bay County will provide approximately three acres along Econfina Creek including 300 feet of flood plain habitat restoration. That land will help protect the first magnitude Gainer Springs and several smaller springs associated with it. It will also improve water quality in Deer Point Lake Reservoir.

Jackson County will acquire approximately 600 agricultural acres within the Jackson Blue Spring groundwater contribution area. Public ownership will facilitate changes in agricultural practices and land use that will reduce nutrient loading to Jackson Blue Spring.

An additional 394 acres adjacent to the spring will be acquired by Jackson County with the intention of implementing long-term preservation to help reduce nutrient loading.

A third matching fund contributor will be the Agricultural BMP Producer Cost Share Program in Jackson County. The goal is to develop and implement agricultural best management practices around Jackson Blue Spring that will improve water use efficiency and reduce nutrient loading.

The Indian Springs sewer connection projects in Jackson County will extend central sewer services to the lower Indian Springs subdivision, removing up to 125 homes from septic systems. This will reduce nitrate levels in Merritt's Mill Pond and Jackson Blue Spring.

In Leon County, the Woodside Heights sewer connection project will receive funding to connect 200 households on septic systems in the Wakulla Springs contribution area to the city of Tallahassee's advanced wastewater treatment system. Phase 2 will include connection of up to 150 additional households.

The Magnolia Gardens and Wakulla Garden sewer connection project in Wakulla County will continue a major initiative to remove existing septic tanks and reduce nutrient loading to Wakulla Springs. Up to 450 homes may eventually be connected to Wakulla County's central sewer treatment facility.

Miami-Dade drinking water grant. Miami-Dade County's Shenandoah neighborhood will get a drinking water system upgrade thanks to a loan from DEP's Drinking Water State Revolving Fund.

The $15.4 million loan will help pay for 16.5 miles of new, properly sized potable water piping, 2,330 water service connections and 1,400 water service conversions.

DEP will provide an additional $9 million over the next few months, fully funding the projects $24 million price tag. Construction began in October and is expected to be completed in February, 2017.

Miami-Dade is initiating a 20-year capital improvement program to improve infrastructure for potable water, wastewater treatment and stormwater management.

Haynes City plant upgrade. Haynes City's drinking water treatment plant number one will upgrade its water purification equipment with $6.2 million in funding through Florida's state revolving fund.

The loan will cover 85 percent of the upgrade's construction costs. Haines City received $4.5 million in the most recent award, adding to a $1.7 million loan received previously.

The low interest loan will provide funding for four pressure vessels to remove dissolved compounds, a storage tank and equipment to add chlorine before and after water enters the new tank.

The primary benefit of the upgrade to

WATCH
Continued on Page 5

Crystal River, Duke partner on reuse project with environmental benefits

By PRAKASH GANDHI

A new reclaimed water project is reducing groundwater pumping as well as wastewater nutrient loading in the Crystal River/Kings Bay watershed.

The project provides highly treated wastewater from the city of Crystal River to the Duke Energy plant in Citrus County.

Infrastructure was built to transport all reclaimed water from the city's wastewater sprayfield to the Duke power generation complex located west of U.S. Highway 19.

Officials said the project benefits the Crystal River/Kings Bay springshed and waterbodies by replacing 750,000 gallons per day of valuable groundwater with reclaimed water for industrial uses at the power plant.

The project also reduces the amount of nutrients, such as nitrogen and phosphorus, entering the springshed by eliminating wastewater discharge to the city's sprayfield.

Construction began in May 2014 and was completed in June this year.

Nick Makris, water supply specialist with the Southwest Florida Water Management District, said the project's success is a result of the high level of coordination between different agencies and groups from initial inception to recent completion.

The Southwest district cooperatively funded the project with the city of Crystal River and the Florida Department of Environmental Protection.

Duke Energy provided additional funds for construction needed within their power plant complex.

"The exceptional private-public partnership between the Southwest Florida Water Management District, the city of Crystal River, the Florida Department of Environmental Protection, Duke Energy, the consulting firms and contractors is a direct testament to this achievement," Makris said.

He said the project provides tremendous water supply and water quality benefits that are critical to the district's springs restoration efforts for Crystal River/Kings Bay.

"Uniqueness is really what sets this apart from other reclaimed water pipeline construction projects," Makris said. "In addition to replacing 750,000 gallons of groundwater pumping with 100 percent reclaimed water, the project directly reduces the amount of nutrients previously entering the springshed."

In addition, the project has direct benefits to Crystal River and Kings Bay.

"In fact, the project has been designed to maximize the potential for the beneficial reuse of reclaimed water by providing upsized water storage and pipeline capacity," he said.

He noted that as more nutrient-laden wastewater from smaller, inefficient package plants and residential septic tanks is incorporated into the city's master wastewater collection and treatment system, the health of the springs will continue to improve—and do so for years to come.

WATCH

From Page 4

the city's drinking water system will be to remove the byproducts produced by reactions of chlorine with organic materials when drinking water is disinfected.

Those undesirable byproducts often accumulate in water distribution pipes, sometimes to the point they cannot be flushed out. The plant upgrades will help remove the organic byproducts of chlorination before the water travels through the distribution system.

IRL water quality funding. The Indian River Lagoon was a big winner for recent water quality restoration grant funding by DEP. Eight of 10 recently selected projects will directly benefit the lagoon.

Project locations span the region. The Jupiter Inlet Colony Neighborhood Rehabilitation Project will replace 240 existing septic systems by connecting the properties to a central sanitary sewer system and will implement major stormwater drainage improvements.

Nutrient-removing baffle boxes will be installed in the city of Melbourne, unincorporated parts of Brevard County and in the city of Edgewater. Other stormwater treatment projects will occur in the cities of Sebastian, Melbourne and Ocean Breeze.

Lastly, drainage and roadway improvements will benefit Boca Ciega Bay in Pinellas County and a nutrient load reduction project is set for Taylor Creek in Okeechobee County.

TBW mini-grants. Tampa Bay Water will again offer $20,000 in mini-grants for groups to conduct projects that promote protection of regional drinking water sources. Local community groups, nonprofit groups, and schools and universities were eligible to apply.

The application period, which closed in mid-November, asked applicants to provide event or project plans related to source water protection in the Tampa Bay Water service area.

The service area includes Hillsborough, Pasco and Pinellas counties.

The grants have ranged from $2,000 to $10,000 and have supported such efforts as river cleanups, educational field trips and public outreach events.

CFWI committee accepts updated documents. At the end of October, the Central Florida Water Initiative steering committee accepted the organization's amended Regional Water Supply Plan and the draft 2035 Water Resources Protection and Water Supply Strategies Plan.

The RWSP is a long-term plan through 2035 for water supply in Orange, Osceola, Polk, Seminole and southern Lake counties.

The plan was developed during more than five years of coordinated effort involving water supply experts and public comment from more than 6,000 local stakeholders who attended public meetings and provided input.

The RWSP is based on a regional groundwater model developed by the Central Florida Water Initiative. The model predicted that potential water supply needs by 2035 would exceed sustainable withdrawals from the Floridan Aquifer by as much as 250 million gallons per day.

The two documents submitted to the water management districts call for more aggressive water conservation programs, more efficient water reuse projects, and a substantial list of alternative water supply projects to ensure adequate water supplies for the growing region through the next 20 years.

Approval from the three water management districts involved is the next milestone for the RWSP, which was on the agenda for the November governing board meetings of the St. Johns River, South Florida and Southwest Florida water management districts.

Plantation Bay utility sold. Flagler County now owns the utility system that serves Plantation Bay, a mostly residential subdivision near Bunnell.

In 2013, the city of Bunnell established a joint agreement with a private developer to own and operate the utility. The recent agreement transfers sole responsibility to the county.

Some administrative details of the transfer of ownership are still being hashed out. City commissioners in Bunnell and county commissioners in Flagler held meetings in early October to approve the transfer, which was described as "harmonious" by a Bunnell official.

Flagler County will immediately assume responsibility and begin implementing improvements to comply with a DEP consent order for improvements of the wastewater system and overall utility operations.

Those improvements include a master lift station, a second treatment plant for redundancy, a reject tank and a rebuild of the Hampstead lift station.

St. Pete utility project. The city of St. Petersburg's new 15-million-gallon reject water tank is under construction at their Southwest Water Reclamation Facility.

The storage tank will hold up to one day's effluent that does not meet water quality assurance tests required for its use as reclaimed water. After being held in the tank, water can be retreated to meet assurance tests and then distributed.

St. Pete's plans have been dogged by controversy since city officials first proposed the upgrade.

The tank is built close to the Eckerd College property line. College officials worried that the 50-foot-tall tank would dominate the view of the college campus as visitors entered.

In addition, odors from the plant have been a recurring complaint and college officials were concerned that the new storage tank would increase the level of odors.

Utility officials said that water in the tank, even if it doesn't meet reclaimed water standards, will not produce odors.

Fiscal subsidies help balance agriculture, conservation if done correctly

By ROY LAUGHLIN

Agriculture is the most dominant land use on earth and will remain so as the world's population and global food demand rise.

That is the theme of a recently published research article, Resolving Conflicts between Agriculture and the Natural Environment, that explores policies and public subsidies to ensure some measure of ecological conservation while maintaining adequate food production.

A fundamental premise is that government subsidies have driven the conversion of natural lands to agricultural use and that similar use of subsidies for ecological conservation may be equally effective.

Agricultural production subsidies and other financial support occur in all advanced countries on all continents but Antarctica. China, Europe and the U.S., in that order, are indisputably the dominant agricultural subsidizers, a practice that correlates with national wealth and population.

Since World War II, government subsidies have paid farmers to maximize food production by guaranteeing a fixed lowest price. Generally farmers produced as much as possible regardless of need or markets, and that led to substantial conversion of natural lands to farmland.

More recently, subsidy programs with direct payments to farmers for following conservation practices including lower intensity production methods and land setasides have been initiated in some places.

However, the report noted that even well-intentioned conservation subsidies may have perverse consequences. If lower intensity practices yield fewer crops, additional land either within the same region or elsewhere is likely to be cleared and put into agricultural production to make up the difference, spreading widely the ecological stress agricultural production entails.

Several case studies in the report, including dairy production in New Zealand, crop subsidies in the U.S., and the Chinese practice of subsidizing fertilizer prices in food markets with substantial price controls, are all examples with slightly different mechanisms and effects, illustrating how agricultural subsidies can work against conservation goals.

The authors, primarily English, point to Europe as a prime example of where "incentivizing low-intensity systems seen as beneficial to biodiversity conservation may similarly limit production and displace environmental impacts while also lacking the full benefits to natural ecosystems."

The authors believe that maintaining the status quo with agricultural policies is unsustainable for the environment.

They propose removing production subsidies and making farmers financially responsible for their environmental impacts, while at the same time allowing farmers to sustain intensive farming so that land conversion to agriculture does not occur elsewhere to meet the rising demand for food.

Effective policy instruments could be a mix of punitive measures such as taxes on inputs that should not be overused, for example fertilizer, as well as positive incentives including subsidies for land permanently removed from agricultural production and managed for conservation.

The report noted that in Mexico water surcharges are used to pay landowners to retain forest watersheds. Input taxes are seen as highly effective because they enable farmers to respond differently to the same policy, in contrast to traditional regulations that require each farmer to meet the same standard and "ignore sectorial diversity," letting farmers have the latitude to do what works for them on their own farm.

More than a dozen case studies are used to show how regulations, policies and subsidies predictably influence agricultural production, even in countries that have no similar political philosophy.

The report noted that conservation subsidies across the globe amount to less than three percent of agricultural subsidies. Consequently many fewer conservation policy and subsidy case studies exist. For those few that were mentioned, it was clear that conservation practices do work as intended.

"While cursory in nature, these results suggest that targeted policies have potential to deliver positive environmental outcomes" to effectively further conservation goals, the researchers noted.

The report said that two major challenges remain for a sustainable balance between agriculture and conservation. The first is winning political support. That, they said, depends on properly informing the public and preventing misleading industry characterizations of the environmental costs of agriculture.

Second, implementation of the policy mixture will vary spatially, and successful strategies of retiring agricultural land will depend on the surrounding landscape, and will reduce yields where the most productive land also has the most valuable environmental assets.

In this case, the loss and benefit will need to be carefully balanced, especially to avoid perverse outcomes that expand agriculture elsewhere.

The report did not discuss the role of new agricultural technologies, but clearly those may be a significant part of the mix. In Florida, water management districts have been assertively providing subsidies to farmers on a case-by-case basis to underwrite new agricultural practices.

In most cases, the districts provided support for new technologies whose capitalization cost is greater than a farmer could risk on his or her own resources.

Recently, the *Florida Specifier* reported on an agricultural assistance project for a mixed aquaculture hydroponics projects with rainwater capture from greenhouse roofs.

In addition, at least three water management districts in Florida provide financial and technical assistance for installing and operating high-efficiency irrigation systems for crop production.

Between the effects of the current drought in California and the recent drought in the Midwest, Americans are beginning to understand how fragile agricultural production is and how dependent a society with a continental scale agricultural effort may still be in the face of fundamental agricultural resource shortages.

Even if technology offers hope, will the political and financial actors move forward early enough to make technology and essential conservation planning sufficiently effective to be useful? The answer may be needed sooner than many expect.

Proposed restoration effort could help restore Pensacola Bay water quality

By PRAKASH GANDHI

A major restoration effort is being proposed for Bayou Chico in Northwest Florida aimed at cleaning up decades of pollution from industrial and other sources.

The Bayou Chico watershed, located in southern Escambia County, represents a 10.36-square-mile drainage area into Pensacola Bay.

Much of the area surrounding the bay is urbanized and consists of older residential subdivisions as well as industrial and commercial use areas.

A plan developed by the Florida Department of Environmental Protection in partnership with the city of Pensacola, Escambia County, the Emerald Coast Utility Authority and other agencies identifies projects and management actions needed to decrease bacteria in six waterbody identification units in the Bayou Chico basin.

In 2006, DEP adopted water quality restoration targets—total maximum daily loads—that provide numerical water quality restoration targets for those six units.

The new plan identifies the actions needed to achieve the restoration targets.

Proposed projects include sanitary sewer expansion, stormwater improvements and others.

The plan addresses the known and suspected sources of fecal coliform and other pathogens. The projects include both stormwater treatment and stream restoration elements.

Pensacola officials said the projects will improve the overall water quality in the bayou. They said the projects will reduce sediment and nutrient loading to Bayou Chico, reduce turbidity, increase water clarity and improve light penetration for photosynthesis. This will enable the expansion of submerged aquatic vegetation habitat.

The projects will complement or accelerate planned restoration activities identified in DEP's basin management action plan for the bayou.

"The department is committed to the restoration of Bayou Chico, and appreciative of the collaborative efforts of all the stakeholders in the basin to implementing water quality improvement projects," said DEP Spokesperson Dee Ann Miller.

SWFWMD leads the way in water reuse, but works to increase capacity

By ROY LAUGHLIN

Over the last decade, the Southwest Florida Water Management District has become both a state and national leader in water reuse.

In 2014, 45 percent of wastewater treatment plant effluent district-wide was treated and reused.

Across the state, only about one quarter of all WWTP effluent is currently reused and, nationally, the statistic is at seven percent.

> In 2014, 45 percent of WWTP effluent with in the SWFWMD was reused. Across the state, only about one quarter of all WWTP effluent is currently reused and, nationally, the statistic is at seven percent.

Since the late 1980s, the water management district has helped fund about 350 water reuse projects, usually covering about half the cost. The district has paid $408 million of the $950 million in total reuse system spending.

"We fund about $21 million per year on average," said Anthony Andrade, reuse coordinator in the district's water supply section. "We've funded about a dozen new projects each year, on average, over the past 10 years."

Wastewater treatment plant reuse typically conjures up images of purple pipes providing water for landscape irrigation in lushly landscaped gated communities. Within the Southwest district, landscape irrigation is a significant end use for the water reclaimed, but several other project types broaden the district's reuse portfolio.

In the district, ten power plants obtain boiler water or cooling water from wastewater treatment plants. Andrade singled out TECO's Polk Power Station, noting that it has won awards for its water conservation and environmental stewardship efforts.

The cities of Mulberry and Lakeland and Polk County wastewater treatment plants all contribute reuse water or, in the case of the Southwest Polk County plant, water from treatment wetlands, to local power plants.

The power company's agreement with adjacent utilities will continue until 2040.

Elsewhere, Duke Energy's Crystal River Energy Complex takes all of Crystal River's WWTP's effluent.

Power plants are a major water user, second only to agriculture nationwide. Providing reuse water to them makes a big dent in the district's total withdrawal of ground and surface waters.

In other places, recharge and natural system enhancement of wetlands are part of the reuse pie. In central Pasco County, treatment plant reuse water is being pumped to a large wetland area spanning both public and private lands.

"We're using reclaimed water as a source to reduce drawdown from nearby public (water) supply fields," said Michael Hancock, PE, a senior professional engineer in the district's resource evaluation section.

Andrade also pointed to potential work that the city of Tampa is considering for a SWFWMD co-funded project to bring water back into the Hillsborough River watershed on the far northern side of the Tampa Bypass Canal.

Some of the studies under consideration now are focused on direct potable reuse or something close to it.

Andrade said that Hillsborough County is considering applying treated wastewater to spray fields near wellfields to augment water supplies.

And Clearwater in Pinellas County is considering becoming the first place in Florida to implement indirect potable reuse.

The plan under consideration is to inject highly purified drinking water into the Floridan Aquifer, and then draw it out as a potable water source from nearby water wells.

The same well would not be used for both injection and recovery, and the water recovered will spend time in the aquifer, allowing for the possibility of "ecological housekeeping functions" to occur.

Aquifer storage and recovery is another part of the mix in SWFWMD's plans for water reuse. The number of ASR facilities in the district is currently less than 10, but they are some of the oldest ASR wells in the state.

"Storage is the critical component of utilizing more of the reclaimed water," said Don Ellison, a senior hydrogeologist in the district's water resources section.

"Whether it's above ground or below ground, storage is going to enable the district to produce more reuse water," he said.

Mobilization of arsenic by increasing oxygen levels in the normally anoxic Floridan Aquifer has been a nagging problem for ASR projects during the last 10 years.

The current 10 parts per billion drinking water standard for arsenic—and the typical measurement of about 15-20 ppb for ASR well water—has been the primary constraint.

Ellison explained that one solution has been to drill ASR wells deeper into aquifer to strata where the water is 1000 mg/liter or higher in salinity—water that would not be used as drinking water.

The high salinity water mixes with water injected through an ASR well and reduces the overall amount of recoverable water, at least in most projects that have been built.

Consequently, some ASR wells recover only about 30 percent of the water injected. Some in the industry view that low efficiency as a significant drawback.

Ellison noted water recovered from such ASR wells may be extended by blending it with surface waters or "new" reclaimed water to ensure lower salinity levels.

Ellison said that the unrecovered water may serve a useful purpose. The 70 percent left in the ground remains beneficial because it "holds up the aquifer's potentiometric water level" and, in wells close to the coast, forms a hydraulic barrier preventing salt water intrusion.

He said that the prime location for ASR wells is close to the coast, where the injected wastewater and its nutrients are diverted from estuaries.

Ellison does not characterize a 30 percent recovery rate as inefficient, when other benefits are also included in the overall system evaluation.

In summarizing the district's future in expanding water reuse, Andrade said that the 50 percent of the water currently not being reused represents a substantial opportunity.

In the future, Andrade said, the district will be shifting its focus to very large projects, away from the familiar residential landscaping irrigation system that he characterized as the most expensive projects per unit of benefit.

Local agencies and public utilities will play a lead role in the new large water reuse projects, and there's no doubt the local utilities endorse water reuse.

One example, Polk County, is in the final months of establishing its Polk Regional Water Cooperative, a consortium of 16 municipalities and county utilities.

Water reuse and conservation are seen as the two most likely sources of "new water supplies" for the county, and cooperative plans are now underway to realize their potential.

The district currently has about 150 million gallons per day of water resources from wastewater treatment plants that are not being reused, and perhaps another 50 million gallons per day from stormwater and other sources that could be reused.

Referring to the huge volume of water that is not now being reused and the prospects for its reuse, Andrade said, "Look at all the potential we have to get more water."

Water industry groups endorse direct potable reuse in annual water resources report

By ROY LAUGHLIN

Direct potable reuse for public drinking water systems received a standing ovation in a recent report, Water Resources Utility of the Future 2015 Annual Report.

Released in September, the report is the product of four water industry organizations including the National Association of Clean Water Agencies, the Water Environmental Federation, the Water Environment Research Foundation and WateReuse.

The report's primary message is that the increasing demands for water and availability reductions due to climate change make it clear that direct potable reuse—treating wastewater to potable water standards—is the best future option for drinking water utilities.

The public and regulatory agencies remain skeptical, with doubts about a complex direct potable reuse system's risks of failure.

That doubt specifically focuses on its low probability but its extremely negative outcomes following any system failure.

Opinion surveys consistently indicate that the public has fears of this type of risk. Favorable numbers from risk analysis do little or nothing to reduce fear in most people.

The report takes a different approach than others in the past that have endorsed direct potable reuse.

The focus on technology is relatively limited. Available technology, including reverse osmosis, and membrane filtration, is certainly mentioned, but readers looking for technical details will have to look elsewhere.

> The primary message of the report is that the increasing demands for water in light of availability reductions make it clear that direct potable reuse—treating wastewater to potable water standards—is the best future option for drinking water utilities.

The report instead substitutes any focus on technological capability with an evangelical endorsement of its merits. That endorsement begins with a discussion encouraging water supply managers to take a more effective route to selling their "brand."

The report noted that in 2009, Americans spent $21 billion on bottled water, compared to $46 billion for all the water consumed from potable drinking water systems. The bottled water market rose from essentially nothing to $21 billion in sales in less than a decade.

The report's authors cite public conversion to bottled drinking water as a monument to successful marketing.

The promotional tone is evident in a new term, "utility of the future," or UOTF, that appears throughout the report. It encourages water managers to innovate, particularly to address three major factors: regulation, fiscal pressures and climate change.

The report endorses that emergence of a new "innovation ecosystem" centered on clean water utilities. Supporting components of this new ecosystem include federal, state and local government; engineering and consulting firms; technology developers and the finance community.

Much of the report focuses on these topics, with technological details sprinkled throughout the discussion headed by these topics.

The new term, UOTF, developed the concept that future potable water treatment is a total recovery process, recovering water as well as other material such as fertilizers for reuse.

Stormwater management and water conservation may contribute to the value of the process.

The report includes a strong and consistently positive endorsement of public-private partnerships as a way to relieve fiscal pressures. The theme is that private enterprise is unfailingly better at developing and owning assets, for whose services public agencies pay, typically with performance-based compensation contracts.

Several case studies mention public partnerships, some of which are not yet in operation, so the recommendation is based on proposed rather than demonstrated outcomes.

A sentence early in the report describes the route forward for UOTFs: "The solution to how we do this is remarkably, but at the same time deceptively, simple: enable utilities to take more risks."

In spite of the strong endorsement of both increasing the threshold of public risk and of public-private partnerships, the report includes little discussion of limiting the extent of public risk or placing appropriate bounds on private profit.

Recently established public-private partnerships have maximized both the risk and the profit.

No recent account of technological innovation would be complete without criticism of regulation.

This particular document includes allusions to the need for new regulatory approaches, from local treatment plant operations to the U.S. Environmental Protection Agency level.

Particularly with respect to the EPA, the agency primarily responsible for drinking water regulations, the report notes new approaches to prioritize water source and treatment options, with costs as a strong influencing factor.

For the public, the issue apparently is not so much one of the will to regulate, but rather will regulators take the time to complete thorough analysis of the low probability/high consequence of system failure.

The EPA funds and oversees the Clean Water State Revolving Fund that up to this point has been a primary funding mechanism for water treatment plants.

Even with the potential for significant private funding, the group exhorts the SRFs to modify existing funding requirements to encourage their UTOF concept, although details on what changes SRFs should make were slim.

Utilities serving communities experiencing drought or with intrinsically limited natural water supplies are prime candidates for direct potable reuse.

Not surprisingly, case studies include public utilities in California, Texas and locations where demand simply outstrips supply.

No case studies were provided for Florida, but with its multiyear cycles of drought followed by adequate rain replenishment—and no population growth management—the state is a prime candidate for direct potable reuse.

Nevertheless, Florida utilities are not leading the charge for adoption of direct potable reuse. Local utilities have so far made it clear that conservation and wastewater reuse is preferable to direct potable reuse.

Some of this report's readers will be put off by the overwhelming tone throughout this report of the need to "sell the public," rather than "demonstrate to the public" the efficacy of potable water reuse.

The private-sector development of potable water reuse technologies, barely a decade old, is advancing but is not as yet an equal to the century-old water treatment technologies now in common use.

Advocacy, the term the report's authors prefer for their endorsement approach and branding effort, may seem inappropriate for public utility professionals whose efforts have a stellar track record in spite of being invisible to most of the public.

Water Resources Utility of the Future 2015 Annual Report was clearly written to influence as well as to inform, so anyone in the business should at least be familiar with its content and the impressions it tries to portray.

SBNEP works to maintain district funding in wake of financial discrepancies

By ROY LAUGHLIN

For the past few months, the boards of the Southwest Florida Water Management District and the Sarasota Bay National Estuary Program have been embroiled in controversy over accounting and billing procedures from a cooperative habitat restoration program at SBNEP.

In mid-October, SWFWMD's Governing Board voted to end its co-funding with SBNEP.

SNBEP's board has since agreed to repay some of the money in question, however the district's decision still hangs in the balance. Support for the SBNEP may continue if the two sides can reach a mutually satisfactory resolution soon.

The disputed funds paid for environmental restoration projects performed since 2008. Mark Alderson, SBNEP executive director, explained that the projects were covered by two different contracts, the first in effect from 2008-2012 and the second in effect from 2013 to the present.

During the first interval, SBNEP billed SWFWMD a total of $172,000, the combined cost of multiple projects. He said without equivocation that there was never a doubt that the cost sharing was one-to-one.

The misunderstanding, according to Alderson, arose over the billing process. SBNEP had been billing the full cost since 2008, and the SWFWMD had paid full cost rather than half, which they could have done under the terms of the contract.

For the years 2008–2012, SBNEP reimbursed the district $86,000 at the end of October. Alderson said they intend to reimburse the district for contract overpayments from the more recent contract, and is actively negotiating mutually acceptable accounting rules for some nonmonetary contributions from local governments.

The controversy seemed to pick up steam late this summer. At their August and September meetings, the SWFWMD Governing Board requested a financial audit of SBNEP, presumably to use that audit to determine if any repayment was due.

The board offered $15,000 to fund half of a third party audit, or to allow the SWFWMD's Inspector General Kurt Fritsch, to conduct the audit. During those months, SBNEP's board offered no response. Then at its early October meeting, the SWFWMD board voted to end management support for the SBNEP.

On Oct. 28, SBNEP's executive board voted unanimously to allow an audit by SWFWMD's Fritsch.

The delay in responding to the district's requests occurred because SBNEP board member Mike Moran was absent from its September meeting. His absence prevented the board from making a decision to comply under their rules.

Moran sits on the boards of both the SWFWMD and the SBNEP, and is on the record as being heavily invested in the effort to get an audit done.

Alderson noted that Moran joined the SBNEP executive committee relatively recently and may not have been aware of circumstances for actions by the SBNEP's board earlier.

The district's governing board has not reversed its decision to end support of habitat restoration projects, even as district and SBNEP staff actively work to determine the amount to be repaid for the recent collaborative projects.

The district's board has 180 days to reverse its decision and restore the status quo ante. Alderson said that the SBNEP staff and board "are doing everything we possibly can to rectify the issues with the SWFWMD."

"They are a big player in environmental restoration in our area," he said.

Pasco County, SWFWMD partner on artificial wetlands project on local ranch

By BLANCHE HARDY, PG

Officials in Pasco County have developed a plan to put excess wet season reclaimed wastewater to good use.

The county's utility department is in the process of designing approximately 200 acres of artificial wetlands to help restore both surface and ground water resources in central Pasco.

The county intends to discharge five million gallons a day of treated wastewater into the created wetlands.

"The wetlands design is at the 60 percent phase now," said Jeffrey Harris, an environmental biologist and project manager for the county's Utility Engineering Services and Contract Management Department.

"We've put together a team of engineers and ecologists to design this innovative approach to ecosystem recovery and enhancement project," he said.

When complete, the wetlands will support existing natural habitats.

Groundwater withdrawal volumes are governed by activities within each water management district's boundaries.

In some cases, permit applicants on one side of a district boundary were asked to make significant concessions due to potential ecological impacts and insufficient supply, while applicants on the other side were literally unfettered in requesting and getting as much groundwater as they wanted.

Historic permitted withdrawals of groundwater, unchecked and unsustainable development levels, and land use changes on a regional scale have contributed to significant environmental degradation in many areas of the state, including Pasco County.

"There are six regional wellfields in Pasco County that serve regional demand in Pasco, Hillsborough and Pinellas counties," said Harris. "Historic over-pumping of those wellfields has led to severe degradation of aquatic systems.

"In the area around and between two of the most productive wellfields, Cross Bar and Cypress Creek, lakes and wetlands and their ecological functions have been impacted significantly."

The proposed wetlands are an attempt to restore part of that function while providing a beneficial use for seasonal excess reclaimed wastewater.

The county approached local landowners seeking public-private partnerships to rehydrate impacted water bodies. The Phillips family was among the landowners experiencing degradation of the natural systems on their ranch lands and expressed interest in accommodating the proposed artificial wetlands project.

Early feasibility studies indicated the proposed discharge could augment the surficial aquifer enough to achieve some recovery of the aquatic systems in the area.

"The delivery of five million gallons of reclaimed water daily to the site will support the recovery of the surficial aquifer and Upper Floridan Aquifer in the area," said Harris.

Project costs could be as much as $10 million, according to an estimate provided by the county. They anticipate that the public-private partnership with the Phillips family will allow for significant cost savings.

The property owners are providing both the land and construction services for the project. The county and the Southwest Florida Water Management District would equally share the remaining costs.

This Pasco County/4G Ranch wetlands, in conjunction with restoration projects throughout the northern Tampa Bay watershed, are expected to make significant advances in the recovery of water resources in Pasco County.

Do the waste disposal practices of "vape" shops constitute an ASTM E1527-13 recognized environmental condition?

By NICHOLAS ALBERGO, PE, DEE

Millions of Phase I environmental site assessments are prepared each year in general accordance with ASTM's E1527-13 standard practice. Fundamental to these assessments is the identification of CERCLA hazardous substances, including RCRA hazardous wastes, which are released to the environment in a manner and at levels that constitute a "CERCLA release" that goes beyond de minimis conditions, or conditions that generally do not present a threat to human health or the environment, and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

There are many commercial business operations that could represent a concern when applying the "recognized environmental condition" concept, which remains central to the ASTM process. Such operations could include dry cleaners, automotive repair facilities and even nail salons, as each involves the use, storage and/or disposal of wastes requiring special handling in accordance with existing hazardous waste regulations.

One commercial business that should be both regulated and assessed in greater detail when compared to, for example, a child care facility (although dirty diapers are as hazardous as you can get!), is becoming ubiquitous in American culture, and yet, appears to have enjoyed a tacit exemption from the assessment rigors afforded to the sort of businesses mentioned previously. This is the business of e-cigarettes, also known as e-cigs, e-juice and "vaping." These products were invented in China in 2003 and began hitting the U.S. market around 2006 or 2007.

Vape shops are popping up everywhere, but should they matter to the practice of performing Phase I environmental site assessments? To be clear, I am not suggesting that the heated juice inside battery-operated, refillable devices that come in a myriad of sizes, colors, shapes and styles are hazardous in and of themselves, or that the guy behind the counter vaping on his electronic cigarette or "box mod" device is somehow relevant to what constitutes a REC under ASTM.

However, what is relevant is the manner in which he disposes of such products, and what he does to maintain the cleanliness of the vape shop itself. Why? Because one of the active ingredients in e-cigarettes is 1-methyl-2-(3-pyridyl) pyrrolidine or 3-(1-methyl-2-pyrrolidyl) pyridine, the chemical names for nicotine, a listed RCRA hazardous waste, requiring special disposal handling practices.

Beyond the matter of nicotine, e-cigarettes are evolving so quickly that we actually don't know what people are smoking, or what other toxic carbonyl compounds such as formaldehyde and acrolein are contained in e-cigarette aerosols and in the residues that cling to the counters, walls and floors of these vape shops.

Past regulation of nicotine products

The U.S. Environmental Protection Agency originally listed nicotine and salts as acutely hazardous wastes based in large part on a then-common estimate that the median lethal dose to humans through oral administration is only 1 milligram per kilogram of body weight. Under RCRA regulations, a waste may be listed as acutely hazardous if it "has been found to be fatal to humans in low doses or, in the absence of data on human toxicity, (it exceeds certain criteria for acute toxicity in laboratory animals)."

However, at the time that nicotine and salts were listed as an acutely hazardous waste under RCRA in 1980, the only nicotine products apparently being marketed were pesticides with extremely high concentrations of the chemical, such as Black Leaf 40 that contained 40 percent nicotine sulfate. E-cigarettes vary but reportedly contain less than 3 percent nicotine. This is obviously quite different than the gum and patch products that were switched from prescription to over-the-counter status between 1996 and 2002, or e-cigarettes that didn't even appear in the market until the mid-2000s.

The last EPA registrations for use of nicotine as a pesticide on food crops were cancelled in 1994 and, as of Jan. 1, 2014, there are no longer any nicotine pesticides registered for use in this country. So, in light of these developments, essentially the only wastes currently covered by the nicotine listing are gum and patch products, and e-cigarette wastes that were not—and could not have been—contemplated by EPA at the time of the listing.

Current regulation of nicotine products

It's a curious thing. Tobacco products are not subject to regulation under RCRA as hazardous wastes—much less as acute hazardous wastes—due to the fact that they are not expected to exhibit any characteristics of hazardous waste and are not listed as hazardous wastes. Although such products obviously contain nicotine, they are not covered by the "P075" listing for nicotine commercial chemical products because they are not a commercially pure grade of the chemical, a technical grade of a chemical or a formulation in which the chemical is the sole active ingredient.

Yet, retail stores in every community offer a wide range of products of which a small percentage is returned to the store by a consumer for any number of reasons. Unsold or returned nicotine products are of particular concern for the retail sector because these products must be managed as acutely hazardous wastes. What is really problematic is that a variety of nicotine-containing products, mainly smoking cessation products like patches, gums and lozenges, and now electronic cigarettes, can push retail stores into the large quantity generator status. The likes of Walmart, Target and Walgreens are especially concerned about this sort of regulation.

Since these tobacco products may be classified as acutely hazardous wastes, handling more than 1 kilogram of such products at any given time, means that retail stores may become large quantity generators of hazardous waste, subjecting retailers to numerous in-store requirements and burdening regulatory agencies with disproportionate oversight responsibilities for many retailers who would not be large quantity generators but for the nicotine products.

Members of retail associations report that low-nicotine products are the sole reason why the vast majority of stores handling such products are classified as LQGs, rather than small quantity generators or conditionally exempt small quantity generators. And, as mentioned, status as a LQG is problematic as it unnecessarily and unreasonably burdens retail stores by requiring biennial or more frequent reports, creating and updating contingency plans, training a high turnover work force and implementing LQG emergency response procedures.

For both LQGs and SQGs, when unsold and returned products are managed as hazardous wastes in the store, they must be sent off-site using a hazardous waste manifest and transported by a licensed hazardous waste transporter. The high costs of transportation are compounded when wastes must be transported across long distances to the limited number of permitted treatment, storage and

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

We may have turned the corner toward more efficiency within PRP, healthier ATCs

By STEVE HILFIKER

The mood of the Florida Department of Environmental Protection Petroleum Restoration Program presentation at the Florida Remediation Conference this year was much more positive than it was one year ago.

Contractors seem to be experiencing much less frustration and expressed much more optimism. The DEP's ability to encumber more projects and streamline some of their procedures appears to be working.

On Oct. 20, the department conducted a teleconference with agency term contractors and presented the latest information regarding work distribution, change orders and other technical developments within the program.

DEP has posted many statistics on their website based on information prepared for these meetings. Most of the sites scored at 46 and higher in the program are either closed or in some phase of monitoring. Most of the sites scored between 30 and 45 are either in site assessment or in the remedial action planning phase.

Over the next year, many of these sites will develop into remedial construction projects.

Currently, there are less than 150 sites in construction, remedial operations or source removal. We need to educate our legislators on the need for consistent funding to maintain the momentum on these sites. We need to build on this progress.

There are approximately 5,000 sites that the department intends to assess over the next five years. Based on information from the agency's Low Score Site Initiative, approximately 27 percent of those sites can be expected to achieve a site rehabilitation completion order. Sites that do not achieve closure through LSSI remain eligible for remediation to cleanup target levels, which is the preferred method of closure for most site owners.

The department has expanded the closure options available to site owners. Some of these options are mentioned below. Florida Administrative Code 62-772.401 rulemaking is almost complete. Property owners able to demonstrate 25 percent cost savings using risk-based corrective action will have more opportunities for contractor selection after the rule becomes effective.

Many property owners need to be educated about the facts regarding their site and its funding eligibility. Their long-term goals for the property should be discussed. It is important for contractors to continue their consulting efforts with them.

Some site owners have a low funding cap and may not want to pay for remedial action after funds are exhausted. These owners would be more open to risk-based corrective action. Some owners have a low score and do not want to wait for funding. These owners may be more interested in the Advanced Cleanup Program or the LSSI.

The memorandum of understanding with the Florida Department of Transportation is enabling more site rehabilitation completion orders with conditions.

As contractors assess more sites using the limited site assessment scope of work, it is important to explain the various strategies to manage environmental risk to site owners. Some would rather have a risk-based closure letter than intrusive remediation.

Others have relied upon the language in Florida Statute 376.3071 for full remediation to cleanup target levels. Many lenders have financed and purchasers have bought property based on the promise of a full cleanup.

Many property owners are realizing that 20 years from now, the retail gasoline industry may not be the same industry it is today. These owners are focused more on property value and resale than long-term facility operations.

Each site is different and each owner has different objectives, which is why education and communication through proper consulting is so important.

The petroleum cleanup industry has an opportunity through continued consulting to improve relationships with site owners and the DEP. In the process, we can help to ensure consistent funding by the state Legislature.

It is important for business managers be able to forecast future work volume to run healthy companies. We need consistent appropriations from the Legislature to do that. As we educate our legislators and clients, demonstrate that we are being good stewards of the trust fund, make proper recommendations to site owners and focus on the best strategy for each site, we will improve the reputation of our industry.

The department has repeatedly stated that they will not force property owners to accept a risk-based corrective action without the property owner's written consent. Therefore, remediation to cleanup target levels is and should remain an option for site owners. The department acknowledges this and at the same time is promoting the other viable options to close regulatory files.

So after two large industry meetings and several internal department meetings, we seem to have turned a corner toward more efficiency and healthier agency term contractors. The program depends on healthy contractors to provide professional consulting services. In the process, more sites will be closed and all stakeholders in the program will see results.

Let's hope that this time next year, the Florida Remediation Conference will feature discussions regarding a petroleum program with a demonstrated a pace of over 400 closures per year. Our goal for next year should be no need for further amendments, a satisfied clientele, legislators able to happily provide consistent funding and steady progress toward making the program even more efficient. Hopefully we can look back on the 2015 Florida Remediation Conference as the turning point.

Steve Hilfiker is president of Environmental Risk Management Inc. in Fort Myers. He can be reached through www.ermi.net.

Calendar

December

DEC. 1-3 – Course: Respiratory Protection, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 3-4 – Conference: FLERA Winter Symposium 2015, St. Petersburg, FL. Presented by the Florida Local Environmental Resource Agencies Inc. Call (248) 933-1069 or visit www.flera.org.

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

DEC. 5-13 (weekends) – Course: Backflow Prevention Assembly Tester Training and Certification, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

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

DEC. 7-11 – Course: Backflow Prevention Assembly Tester Training & Certification, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

DEC. 8-10 – Course: Introduction to Electrical Maintenance, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

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

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

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

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

DEC. 9-11 – Conference: 2015 Florida Stormwater Association Winter Conference, Orlando. FL. Call 1-888-221-3124 or visit www.florida-stormwater.org.

DEC. 10 – Seminar: CERCLA@35: Looking Back, Looking Forward, Washington, DC. Presented by the Environmental Law Institute. Call (202) 939-3800 or visit www.eli.org.

DEC. 10-11 – Course: Backflow Prevention Recertification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 10-11 – Course: Backflow Prevention Recertification , Destin, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 11-12 – Course: Backflow Prevention Recertification, Venice, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

DEC. 15-17 – Expo: 2015 Groundwater Expo, Las Vegas, NV. Presented by the National Ground Water Association. Call 1-800-551-7379 or visit www.groundwaterexpo.com.

DEC. 17-18 – Course: Backflow Prevention Recertification, West Palm Beach, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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JAN. 4-8 – Course: Backflow Prevention Assembly Tester and Certification, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

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

JAN. 11-15 – Course: Wastewater Class A Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 12-15 – Course: Wastewater Class B Certification Review-, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 15 – Conference: 25th Annual Southwest Florida Water Resources Conference, Ft. Myers. FL. Presented by the Florida Section of the American Water Resources Association. E-mail awra@awraflorida.org or visit www.awraflorida.org.

JAN. 25-29 – Course: Backflow Prevention Assembly Tester Training and Certification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 25-27 – Course: Asbestos: Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 28-29 – Course: Asbestos: Management Planner, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

JAN. 30 – Meeting: Quarterly Membership Meeting of the Florida Ground Water Association, Crystal River, FL. Call (850) 205-5641 or visit www.fgwa.org.

JAN. 30-FEB. 7 – 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.

February

FEB. 1-5 – Course: Water Class A Certification Review, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

FEB. 1-3 – Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 2-5 – Course: Water Class B Certification Review-Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 3-5 – Course: Backflow Prevention Assembly Repair and Maintenance Training and Certification, Lake Buena Vista, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 4 – Course: Asbestos Refresher: Worker, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 5 – Course: Introduction to Lift Station Maintenance, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

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

FEB. 15-19 – Course: Backflow Prevention Assembly Tester and Certification, Destin, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 16 – 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.

FEB. 16 – Course: Asbestos Refresher: Inspector, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 17 – 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.

FEB. 17-18 – Seminar: Winter Water Seminar, Tallahassee, FL. Presented by the Florida Engineering Society. Call (850) 224-7121 or visit www.fleng.org.

FEB. 18-19 – Course: Backflow Prevention Recertification, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

FEB. 18 – Course: Asbestos Refresher: Worker Trainer, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 21-23 – Summit: 2016 Joint Summit: Partners in Progress, Orlando, FL. Presented by SWANA Florida and Recycle Florida Today. Call (727) 940-3397 or visit www.swanafl.org.

FEB. 22-23 – Course: Backflow Prevention Recertification, Destin, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 23-25 – Course: Train the Trainer: How to Design & Deliver Effective Training, Gainesville, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570 or visit www.treeo.ufl.edu.

FEB. 27-28 – Course: Backflow Prevention Recertification, Tampa, FL. Presented by the University of Florida TREEO Center. Call (352) 392-9570.

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Thank you!

ECUA scrambles to find alternative to closed materials recycling facility

By PRAKASH GANDHI

Officials in northwest Florida say a successful recycling program will continue to flourish despite the unexpected closure of a facility in Alabama where their collected materials were being taken.

The Emerald Coast Utilities Authority, which serves about 75,000 customers in Escambia County and another 18,000 in Santa Rosa County, is ponying up $7.5 million to renovate a building at the county-owned Perdido Landfill and turn it into a recycling processing facility.

ECUA launched its recycling program in January 2009 and it's been a big success, said ECUA Spokesperson Nathalie Bowers. "Participation in the program has steadily increased," she said.

The authority's customers are offered recycling pickup along with their regular waste services.

ECUA had been taking the recycled materials to a facility in Montgomery, AL, Bowers said. But the facility closed in October because of a sharp drop in the market price of the materials.

Bowers said that since then, ECUA has diverted 30 percent of recyclables to a small facility in Baldwin County, AL, and the remainder is being sent to the Perdido Landfill.

"For the past two years, we have been taking our recyclables to the facility in Montgomery," Bowers said. "We had a two-year contract with them that was due to expire in May next year.

"We were trying to find a facility that would serve our needs once our contract expired. But in the meantime, the facility where the recyclables were being sent closed unexpectedly. We have been working with Escambia County on a joint project to build a regional facility."

ECUA hopes to have the new facility open by March next year.

Annual operational costs for the new recycling facility are estimated at $1.5 million, but ECUA expects the facility to break even by selling the material it processes.

ECUA will take over the processing of Escambia's organic waste as the building being turned into the recycling facility is currently being used for that purpose.

The county will continue to search for a permanent recycling facility as the new facility is built.

"Our recycling program continues to grow and we expect that growth to continue in the future," Bowers said.

Collaborative effort reduces nitrogen loading to Levy Blue Springs

By PRAKASH GANDHI

Officials in the North Florida town of Bronson have completed the Levy Blue Springs water quality improvement project that's expected to reduce nitrogen loading to groundwater by 1,830 pounds annually.

Bronson currently has a very limited gravity sewer collection system. The town developed a multi-phase plan to expand municipal sewer service throughout the town.

The transition includes removal of septic tanks from service and rerouting of the wastewater to the town's wastewater plant for treatment.

Most of the buildings along the commercial corridor were formerly without municipal sewer service and used septic tanks, most of which were installed 30 to 40 years ago.

The project was a collaboration between Bronson, the Suwannee River Water Management District, the Florida Department of Environmental Protection and the U.S. Department of Agriculture Rural Development Assistance.

Bronson finalized the first phase of the project in the spring this year. The second phase was completed this summer, extending the sewer service to the Bronson Recreation Park, providing additional protection to Levy Blue Springs.

The total project costs were $3.1 million for both phases.

Abby Johnson, a spokesperson for the district, said they received 40 new government cost-share applications of which Levy Blue was one.

She said that over the past two years, the district has devoted significant funding for projects to provide water quality and quantity benefits to springs within the district. Several of these projects are now underway.

ALBERGO

From Page 10

disposal facilities that accept hazardous wastes commercially. Because these products are in substantially the same form, quantity and packaging as products handled safely by retailers in forward distribution by store personnel and by consumers, reverse distribution simply does not warrant the extraordinary measures imposed by the current RCRA regulations, and yet, they are mandated. But, I digress.

Where does DEP stand?

Do the states regulate nicotine as a hazardous waste under the federal Resource Conservation and Recovery Act and corresponding state law? In most states, all sections of 40 CFR have been adopted by reference. In Florida law, this is referenced within Chapter 62-730, Florida Administrative Code, and thus the simple answer is yes.

In general, the Florida Department of Environmental Protection mandates that businesses that generate waste, including pharmaceutical waste, are required to determine whether their waste is regulated as a hazardous waste prior to disposal. Potential hazardous waste pharmaceuticals include prescription drugs, chemotherapy agents, controlled substances and over the counter items that are expired, damaged or otherwise not usable for their intended purpose.

Nicotine is listed as an acutely hazardous waste in 40 CFR 261.33. Currently, the DEP considers that used nicotine patches and gum are not hazardous waste because the listing description applies only to unused commercial chemical products and spill residues. However, unused nicotine patches and gum are hazardous waste, if discarded. To be in compliance, residues from a spill of unused preparations of P-listed waste must be managed as hazardous waste.

O&M practices in vape shops

How do you know whether or not there has been a "release to the environment," the key linchpin of the REC definition? For purposes of this discussion, let's assume that all vape shops manage unsold and returned nicotine products as acutely hazardous wastes. (I doubt it, but let's move on). I guess it then comes down to the manner in which these shops dispose of their towels, rags, mop water and any other cleaning materials that could come in contact with the nicotine residue. Think of it in the same manner that dry cleaning filters separate out solid fines, and the resultant waste filters are deemed a hazardous waste.

In accordance with the "derived from" rule, 40 CFR 261.3(c)(2)(i), any solid waste generated from treatment, storage or disposal of a hazardous waste is a hazardous waste and thus subject to the land disposal restrictions. My suspicion is that, in most instances, these items (paper towels, rags, mop water, etc.) go directly into commercial dumpsters in alleys or directly onto asphalt or unpaved alley accesses behind buildings.

Now, not to bang too hard on our vape shop brethren, but I doubt that they are well versed in RCRA and prepared to answer questions that pertain to RCRA compliance. So, and if you are so inclined, you may wish to consider inquiring as to whether or not there is a separate container labeled "hazardous waste" or "acutely hazardous waste" that contains, but is not limited to, empty vials, bottles and containers that contain or have contained nicotine. One might also inquire about the storage of towels and rags that have been used to clean surfaces exposed to vapors, as well as the manner in which the bong or mop water is currently handled.

Keep in mind that once a product has expired, it is considered a waste under RCRA unless it can be returned to the manufacturer for credit and must be disposed of in accordance with hazardous waste regulations. My suspicion is that, more often than not, the disposal practices of a vape shop that are subject to a Phase I environmental site assessment should be considered a REC.

Nick Albergo, PE, DEE, is a senior engineer with GHD in Tampa, the ASTM E 50.02 vice chair on environmental assessment, risk management and corrective action, and one of the original authors and trainers of the E 1527 Standard Practice for Environmental Site Assessments.

New phosphate processing technique promises to make production more friendly to the environment

By ROY LAUGHLIN

JDCPhosphate Inc. in Ft. Meade is betting that a recent advance in their phosphate beneficiation process—the improved hard process, or IHP—will improve phosphate ore beneficiation, both economically and by reducing its adverse environmental consequences.

IHP relies on a kiln to produce elemental phosphorus vapor that yields phosphoric acid following oxidation and reaction with water. The pretreatment of phosphate ore consists of grinding, forming millimeter-sized pellets that include silica and a small percentage of aluminum, magnesium and iron, drying and then kilning with petroleum coke.

In the kiln, carbothermal reduction produces elemental phosphorus vapor, said Tip Fowler, JDCPhosphate's chief executive officer. Phosphorus vapor burns to produce heat and phosphate. The phosphate, when combined with water, forms high purity phosphoric acid.

The process is self-sustaining once started. In the kiln, exothermic phosphorus vapor combustion produces sufficient heat to continue the carbothermal reduction of phosphate in the ore.

The pellets that remain after phosphate extraction are both dry and nonhazardous. They can be used in concrete or as soil amendment.

Fowler said that his company is heavily invested in characterizing the pellets' suitability for other uses. They fully intend for the pellets leaving the kiln to be a commercial product, not a waste product. The company has trademarked them as J-ROX.

IHP will yield phosphate from a wider variety of ores and from sources with lower phosphate levels than the wet process requires. Successful extraction depends on the kiln process, as long as silica is in excess to prevent the pellets from melting. Optimizing the heating rate and contact time with petroleum coke improves the yield.

In the company's pilot plant in Fort Meade, up to 95 percent of the phosphate is recovered.

Over the past 50 years, the wet process has dominated phosphate ore beneficiation. Among its disadvantages are the need for higher phosphate levels in ore. In addition, its waste foot print includes highly acidic wastewater contaminated by fluoride and sometimes having high radium and uranium levels.

JDCPhosphate is a technology company, Fowler noted. It owns no phosphate reserves.

He made three major points about the environmental benefits of the IHP process. First, it uses ore with lower phosphorus content, as much as doubling the yield of phosphoric acid per acre of disturbed ground.

Second, some types of waste from the wet process can be used by IHP as a phosphate source.

And finally, phosphoric acid produced by IHP is sufficiently pure to be used to make liquid fertilizers that are increasingly used for drip irrigation and for other application farming.

The economic benefits for Florida in particular are substantial. By mid-century, ore deposits suitable for the wet process could be completely mined out. Use of the IHP process could continue the current level of phosphate extraction into the foreseeable future.

JDCPhosphate currently operates what Fowler characterized as a "demonstration plant" in Ft. Meade. The operation provides data that will allow the company to confidently scale up to a full-size production plant using kilns four times the size of that of the current plant.

Once the demonstration plant yields sufficient data to design a full-scale plant, they plan to move forward either through a partnership or through licensing the technology.

University of Florida IFAS opens biological research center in Cedar Key

By BLANCHE HARDY, PG

The University of Florida has repurposed a former motel in Cedar Key to create a new Nature Coast Biological Station.

The NCBS is part of the university's Institute of Food and Agricultural Science.

"The station will offer a facility for field-based operations in the Nature Coast, including mooring of research vessels at a deep-water access dock and excellent access to the region by road," said Michael Allen, PhD, NCBS director.

"The facility will also have some dorm space and room for visiting scientists, faculty and students to work when they are not in the field," he said.

The new lab will continue the center's heritage as a base for research on clams. Florida clam sales generated about $12 million in 2012 according to IFAS data. The corresponding gross revenue, counting production, job income, tax and similar processing returns generated approximately $38.7 million.

The new location is favorable for NCBS operations.

"Cedar Key is in the center of the Nature Coast region (Wakulla to Hernando counties) and most of the hard clam aquaculture industry locally," he said. "We plan to build a research clam hatchery at the site, which will improve our ability to develop clams that are more tolerant to changes in salinity and temperature, and thus, can improve that industry."

Having the new lab in place may also help reduce the time required to process water samples needed to test for the presence of contamination and, therefore, the commercial viability of the shellfish during aquaculture farming.

"The station is in downtown Cedar Key with lots of tourists that pass by each day, which offers excellent opportunities for public outreach and education," noted Allen. "We see this site as a key facility to allow collaborative research, field-based courses and workshops, and excellent public outreach opportunities."

The new facilities at NCBS Cedar Key will be able to host labs from NCBS's key cooperators including the Florida Fish and Wildlife Conservation Commission's Kirkpatrick Marine Laboratory and the Lower Suwannee National Wildlife Refuge.

"It's a natural location for us to partner with state and federal agencies" Allen said. "The location also has critical fish and wildlife resources locally, so that creates great opportunities for research, teaching and outreach."

The new center provides opportunities for several agencies and organizations.

"The NCBS includes partners across UF, as well as state and federal agencies in the region," said Allen. "We are working with the Florida FWC, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, and the Suwannee River Water Management District, and others. We have projects underway and in discussion that address all aspects of natural resources in the region."

Planned activities within the next year include bird ecology for the American oystercatcher, sea turtle abundance and habitat use, spotted seatrout population dynamics, economics of oyster culture, and human-manatee interactions in the Crystal River National Wildlife Refuge.

"So far we have found that our partner agencies are excited about this new station and ready to get to work to improve the conservation and management of natural resources in the region," he said.

DEP air division honored

The Florida Department of Environmental Protection's Division of Air Resource Management was awarded two 2015 Best Practices designations from the Association of Air Pollution Control Agencies for its AirCom compliance and enforcement database and its Florida Air Inspector Reference training program.

DARM staff and Kyra Solutions worked together to develop AirCom, a database and field-inspection tool to better achieve compliance and enforcement goals.

DARM staff worked with Trinity Consultants to design the FAIR training program that provides both new and veteran inspectors with the core knowledge and tools necessary to ensure thorough and consistent oversight of Florida's regulated community.

Self-contained sewage treatment plant could have multiple applications

By ROY LAUGHLIN

For at least the last four years, a research group lead by Professor Daniel Yeh, PhD, assistant professor in civil and environmental engineering at the University of South Florida, has prototyped a small, mobile wastewater treatment plant for use in Third World countries.

It is a solar-powered, self-contained, mobile, integrated chemical, mechanical and electrical water treatment system capable of handling the wastes of about 100 people.

The device is called the NEWgenerator, for nutrients, energy and water. Using membrane filtration, it produces disinfected water for use or disposal without pathogen risk, methane from biosolids, and a disinfected solution containing nitrogen and phosphorus that could be used as fertilizer. A hydroponics unit on the side of the module can be used for nutrient removal.

Water passing through the filtration membrane could be used for crop irrigation, for gray water inside a home or other non-potable uses. The reject from the membrane filtration contains plant nutrients. It could be used for either hydroponics or land application after disinfection, or it could be sent to a sewer system for disposal.

The device has a number of electricity-dependent components including those to enhance wastewater pumping and filtration, sensors and actuators to control those processes, and communication capabilities so that remote operators can monitor its use to ensure the system is operating properly and has adequate reagents to function.

The NEWgenerator has batteries recharged by photovoltaic panels to generate its own power where external electricity sources are absent or unreliable.

NEWgenerator's development began in 2002 when Yeh was a postdoctoral researcher at Stanford University in Palo Alto, CA. He brought his research interest to USF, where the project received substantial input from research assistants and students.

The research effort has received a number of awards as well as financial backing. In 2011, the Bill & Melinda Gates Foundation awarded Yeh a Grand Challenge Explorations grant. He also received $100,000 to develop the prototype system.

Other financial support came from the Florida Energy Systems Consortium, and a USF Graduate School Sustainable Health Communities grant.

An early prototype of the system was tested at a local charter school. In 2014, Yeh's engineering program received USF's Cade Museum Prize and $50,000.

The government of India has also contributed to NEWgenerator's development. One of the earliest shipments of NEWgenerator QuadCons was shipped to India this fall. A company in India that produces toilets that will serve as NEWgenerator's front end for human use will partner in India's testing, which is expected to last a year.

If testing is successful, NEWgenerator may be licensed for commercial production or Yeh may form a company to build them.

NEWgenerator fills the technological niche for human waste treatment that lies somewhere between an outhouse and a package wastewater treatment plant. The tests in India will verify that it provides suitable sanitation consistent with Third World operation and maintenance capabilities.

Many such regions have sufficient water but sanitation is the critical element needed to make it safe and useful to the most people.

NEWgenerator could serve a village, a neighborhood, or small encampments such as those increasingly formed by refugees in some parts of the world.

Biodiversity, biotechnology may support technology to help reduce emissions

By ROY LAUGHLIN

A research group at the University of Florida may be on to something big as they further characterize an enzyme that may be useful in removing CO2 combustion emission streams.

The enzyme they are studying is carbonic anhydrase, or CA, from a deep-sea Archaea, *Thiomicrospira crunogena* XCL-2, found at Pacific deep sea vents.

Carbonic anhydrase is a ubiquitous enzyme of ancient origin occurring in almost all living organisms. It reversibly catalyzes the reaction of CO2 with water to produce carbonate.

Because *Thiomicrospira crunogena* occurs near vents of geothermally heated brine in the deep ocean, enzymes in their cells are resistant to high temperatures, high pressures and sometimes elevated concentrations of heavy metals and brines that are toxic to the typical shallow water marine organism.

In response to variable and sometimes extremely warm environmental conditions, *Thiomicrospira crunogena* has acquired by natural selection a form of carbonic anhydrase that is capable of binding CO2 and converting it to bicarbonate in temperatures from a few degrees above freezing to 72°C, almost twice that of human body temperature.

The broad range of the enzyme's thermal stability makes it an appealing prospect for a sustainable biotechnology to remove CO2 from combustion emissions of fossil fuels, and sequester it as a salt, as the bicarbonate anion.

Discovery and characterization of *Thiomicrospira crunogena* heat tolerant carbonic anhydrase is relatively recent. University of South Florida Associate Professor Kathleen Scott, PhD, discovered the organism around 2009. That same year, Natalia Diaz-Torres, a graduate student, began characterizing the organism's genetics. She also modified *Thiomicrospira crunogena* genes so they could be transferred to and expressed in easily-cultured *E. coli*.

A year later, Brian Mahon and Avni Bhatt, graduate research assistants in Dr. Robert McKenna's University of Florida's lab, began to study the CA enzyme's biochemical and catalytic behavior.

"It has evolved to be an extremely heat-stable enzyme in the organism," said Bhatt. "When we extract it, it has those same characteristics."

Using *E. coli* cultures, an essentially unlimited amount of this enzyme could be produced. In their research article, the authors attributed the heat stability to a single unique disulfide bond thought to stabilize the enzyme's structure in high temperatures.

So far, researchers on the UF team, along with Italian researchers Daniela Vullo and Claudiu Supuran with the Universita degli Studi di Firenze in Florence, have characterized CA's tolerance to potential inhibitory substances. They showed that it is inhibited by anions such as chloride, bromide and sulfide, and some heavy metals.

They have also characterized it as "less efficient" in terms of its turnover number than CA found in human tissue. Mahon said it is about 100 times less efficient as a catalyst as human CA, one of the most efficient CA forms.

"We are trying to re-engineer it to keep its heat stability and regain that 100-fold loss of activity," said Mahon.

Nevertheless, the turnover number of *Thiomicrospira crunogena* CA is sufficient so that when enzyme molecules are sequestered at relatively high concentration in SDS gel, substantial conversion of CO2 to bicarbonate occurs.

Mahon said luminescent or calorimetric dye indicators show "instantaneous" carbon dioxide conversion.

"We want to see how we can immobilize the enzyme on a gel," he said. "If it's immobilized, it might be more stable and give a longer time before we have to replace it in a column."

Because enzymes act only as catalysts, the ratio of products and reactants affect the direction of the catalyzed reaction. The researchers so far have found no indication that their CA is too sensitive to bicarbonate concentration to be useful trapping CO2.

"It is possible that bicarbonate could inhibit the enzyme at very high concentrations," Mahon said. "Most likely these con-

EMISSIONS
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Canaveral Port Authority approved for temporary suspension of rail plan

By BLANCHE HARDY, PG

On the heels of significant opposition, the Canaveral Port Authority received approval from the federal Surface Water Transportation Board's Office of Environmental Analysis in November for a temporarily suspension of its environmental review of a proposed new rail corridor and bridge to service the port.

The controversial Port Canaveral Rail Extension would connect the port to seventeen miles of existing rail line within NASA's Kennedy Space Center. The intent is to construct a final main line connection the Florida East Coast Railway.

The proposed rail line would begin near the authority's north cargo area and travel west over a newly constructed rail bridge spanning the Banana River Lagoon. It would then enter KSC on Merritt Island south of Kars Park and proceed north through the Merritt Island Wildlife Refuge to connect with the KSC's existing rail line.

The extension was requested in order to explore the feasibility of alternate routes through Cape Canaveral Air Force Station even though OEA excluded the Air Force station from the required environmental impact statement.

Environmental advocates and others are opposed to both the Banana River crossing and refuge intrusion.

The Banana River Lagoon is within a 30,000-acre aquatic preserve and home to among the highest density of endangered West Indian manatee in Florida.

Florida Department of Environmental Protection data indicates that the northern Banana River is the most important spring habitat for the east coast population of manatees.

The river also supports the largest rookery of pelicans on the Atlantic Coast. The abundant and healthy seagrass and mangrove ecosystem supports large gamefish.

The potential damage that construction could do to the ecology of the river and refuge, coupled with the perpetual hazard of transporting possibly polluting cargo over the same pathway, prompted citizens to request and receive support from Brevard County Commissioners.

The commissioners unanimously approved a resolution opposing the CPA's currently proposed rail route, suggesting that they pursue alternative routes.

OEA's temporary suspension letter indicates the potential Air Force station rail alternative would "originate at Port Canaveral, extend north through CCAFS, turn west to cross the Banana River to Kennedy Space Center via NASA Parkway East, and finally connect with KSC's existing rail line."

Site visits and correspondence between OEA and the Air Force's 45th Space Wing have uncovered a significant list of concerns about the proposed alternative route, including the presence of Native American burial sites, National Historic Landmarks, the presence of several federally listed threatened and endangered species and associated "critical" habitats.

FEDFILE

From Page 2

Louisiana's 45-day comment period extends into mid-November.

The 60 billion pounds of hazardous waste, according to the EPA, is the largest amount ever covered by a RCRA settlement and established a precedent for enforcement actions by the EPA over violations in the fertilizer industry.

"The settlement provides further assurance that Florida's residents and environment will be protected for generations to come," said DEP Secretary Jon Steverson. "The consent agreement will codify best practices, implement innovative new processes to reduce waste and require that Mosaic maintain additional financial resources to address the closure and long-term care of its fossil gypsum systems.

NOAA coastal community grants. The National Oceanic and Atmospheric Administration will support five new projects in California, Oregon, North Carolina and Hawaii intended to give coastal communities effective ways to exploit natural infrastructure to improve their coastal resilience planning for sea level rise and coastal flooding.

The money will be routed through NOAA's Ecological Effects of Sea Level Rise Program and Climate Variability Initiative.

The state of Florida was not among those receiving funding.

The grants reflect a recent NOAA perspective on preparing coastal communities for the effects of sea level rise. The approach involves bringing research, scientific information and tools to bear on balancing ecological, social and economic goals.

NOAA hopes to enhance resilience to sea level rise and flooding by promoting preparedness response, recovery and adaptation.

Desal report. According to a recent Frost & Sullivan report, about 17,000 desalination plants are in operation in 150 countries worldwide. A doubling of that capacity in the next five years is predicted.

In 2015, the desal market had revenues of $11.66 billion, estimated to grow to 19.08 billion by 2019.

The report, Analysis of Global Desalination Market, based its prediction, in part, on desalination plants now under construction in the United States, India, United Arab Emirates, Saudi Arabia and Mexico.

Drought is the primary justification for predicting substantial desalination growth in the short term. In California alone, 17 plants have been proposed to provide potable water from oceans or bays.

Continued expansion of desalination facilities in other drought-stricken regions with lower standards of living may limit future growth of large desalination plants.

The expense and complexity of desalination plants is one factor that may cause slower than predicted growth. A lack of regulatory support in several regions, according to the report, also limits the technology's use and market expansion.

The technology uses large amounts of energy and the disposal of its brine byproduct will continue to be a prime challenge until, as one commentator said, "a technology upgrade puts this issue to rest."

Miami-Dade homebuilder settlement. The EPA announced a financial settlement with Juan Carlos Sainz, a Miami-Dade homebuilder, over alleged violations of the federal Clean Water Act dating to a 2006 permit.

Sainz's company, Sion Home's Builder LLC, received a permit to fill 9.28 acres of wetlands in return for a $222,482.96 mitigation payment to the Miami-Dade County Wetlands Compensatory Trust Fund.

The U.S. Army Corps of Engineers discovered in 2013 that Sainz had paid only half of the mitigation payment. The recent settlement, a consent agreement, requires Sainz to repay the remaining outstanding balance, along with $30,267 in interest on the unpaid balance and a $45,000 civil penalty for failure to pay.

2015 environmental justice grants. The EPA's Environmental Justice Small Grants Program will award almost $1.2 million to 40 nonprofit and tribal organizations to fund efforts addressing environmental justice.

The grants cover a broad spectrum of activities including research, education and solutions to local health and environmental issues in minority and low income communities burdened by harmful pollution.

This year, 36 of the applicants received funding from EPA's Office of Environmental Justice, and four additional projects with an EJ focus in the Gulf Coast region received money from the EPA's Gulf of Mexico Program.

The grant projects focus on reducing exposure to air pollution from diesel exhaust, sustainable agriculture, protecting farm workers from health impacts of pesticides and increasing community climate resiliency, among others. All of these are themes of more expansive EPA efforts.

Notable this year in the awards list was the absence of recipients in EPA's Region 4, with the exception of three grants supported by the Gulf of Mexico Program.

Milton to construct new wastewater treatment plant

By BLANCHE HARDY. PG

After several years of consideration, the city of Milton posted public notice of a permit for proposed construction of a new wastewater treatment facility. George Rials, Milton's public works director said this formally opens the period for public comment.

"This plant is not intended to replace the other plant under the first phase," Rials said. "The current plant will continue to operate."

The city's existing treatment plant discharges to the Blackwater River, operates at about 1.75 million gallons per day and has a permitted capacity of 2. 5 mgd.

Rials explained that the proposed plant will operate at 1.9 mgd at startup but the design will allow the treatment capacity to be expanded to as much as 8 mgd.

The city acquired property in the Santa Rosa County Industrial Park in East Milton for the new facility. The current treatment plant is south of the county courthouse on Emira Street just west of, and in close proximity to, the Blackwater River.

Previously proposed development and the upswing in the economy, as well as environmental considerations, were factors in determining if the new pant was needed.

Milton has experienced marked growth on its east side. According to the city, 45 percent of the current wastewater flow originates in East Milton.

The decision to pursue the new plant is the result of a capacity analysis performed to investigate alternatives for increasing the capacity of treatment and managing the treated wastewater without discharging to local surface waters.

"Certainly, we want to eliminate the surface water discharge to the Blackwater River, designated as a Florida Outstanding Water," said Rials, adding that the proposed new discharge basins are "a priority project for us."

Although not required by the state, effluent generated from Milton's existing facility consistently complies with advanced wastewater treatment standards.

The city selected a system from Aero-Mod Inc. for the new plant. Aero-Mod plants require few moving parts to be located underwater. The manufacturer's data indicates that no use or minimal use of submerged parts results in less maintenance and less frequent replacement over the life of the plant. Discharge from the new plant will flow into a series of land-based rapid infiltration basins.

Rials said the city will be looking for cost-sharing opportunities to help with construction of the new plant.

"The city could install the required effluent force main from the current plant to the new plant discharge site and eliminate all surface water discharge," Rials speculated, "depending on financing and if we can afford to build both the new plant and force main at once."

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centrations would never be reached during the CO2 sequestration process."

The UF researchers, Mahon noted, are not alone characterizing AC as a CO2 sorbent in a technological application.

"Along with our group, there are companies that are also pursuing CA as a way to sequester CO2," he said. He named Canada-based CO2 Solutions Inc. and Carbozyme Inc. of Monmouth, NJ, as two of them.

The advantages of a successful implementation could have incredible financial potential. With just water as a reagent and bicarbonate as the product, a robust CO2 sequestration based on CA could require far fewer material resources and disposal of bicarbonate could be relatively simple.

But a discovery is not a technology. The research team is working now to build a partnership with engineers to transform their promising research results into a useful technology.

"From our perspective, we are basic researchers. We're less on the application side," said Bhatt. "The story (of our research) emphasizes basic studies. We got to the point of assessing the validity of this enzyme as a candidate (CO2 sorbent)."

It may take another year or so to reach the next level, through successful collaboration with engineers. They are now actively pursuing that collaboration.

PETROLEUM

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"when it is believed to be the best value to the state," said Elliott.

In the AC program, the proposal initiator is free to propose bundling at the outset.

Participation in the AC program costs owners a greater share of cleanup costs in return for getting state funding more quickly. For PRP, the savings provided by owner cost-sharing offsets the short-term expenditures to provide funding for lower priority sites.

The application period closes Dec. 31, 2015.

GLADES

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flows constricted for over 85 years.

"The Florida Department of Transportation and Everglades National Park are advertising for a design-build contract to raise and bridge an additional 2.6 miles of the Tamiami Trail," Smith said.

The proposed span will be part of the eventual 6.5-mile Everglades Skyway elevated roadway. The skyway is intended to restore fresh water to Shark River Slough, identified by the Sierra Club as the primary artery for the delivery of fresh water to Everglades National Park.

Addition projects are underway to restore water flows including the C-111 South Dade and West Spreader Canal Project that will use several pump stations to move water, as well as efforts to degrade the southern C-111 levee and other water detention areas.

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