

2013 Biosolids Performance Report

June 2014

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National Biosolids Partnership Recertifies KUB Program at Platinum Level

DEKRA CERTIFICATION INC. VERIFIED THAT KUB'S Biosolids Management Program continues to meet National Biosolids Partnership (NBP) Platinum requirements through an audit December 12 and 13, 2013. KUB's program, which originally achieved Platinum certification in December 2011, is one of only 34 nationwide and two in Tennessee certified by the NBP.

The audit also noted that KUB's program is functioning effectively and generating positive outcomes. During the audit, DEKRA noted the following strength in the KUB biosolids management program: "KUB has an excellent understanding of how to use the corrective and preventive action process."

The audit found no major nonconformances. KUB has already submitted a corrective action plan, which the auditor approved, for two minor nonconformances noted in the audit.

KUB achieves 100 percent beneficial reuse of its biosolids (the nutrient-rich byproduct of wastewater treatment) by providing around 30,000 tons a year to local farmers as fertilizer registered with the Tennessee Department of Agriculture. That use helps improve farm land and keeps the biosolids out of landfills.

For more information, go to www.kub.org, Hot Topics Index, and follow the Biosolids link.



KUB Qualifies for NACWA and WEA Awards

KUB'S EASTBRIDGE AND KUWAHEE WASTEWATER PLANTS qualified for peak performance awards from the National Association of Clean Water Agencies (NACWA) in 2013. Eastbridge, which first became a Platinum Award winner in 2010, again met Platinum criteria with no violations for five years. During this five-year period Eastbridge had an opportunity for 23,960 possible violations of daily, weekly, and monthly compliance checks. Eastbridge also received an Operational Excellence Award for zero violations from the Kentucky-Tennessee Water Environment Association (WEA).

Kuwahee, KUB's largest wastewater treatment plant, treats an average of 36 million gallons a

day. It qualified for a NACWA Silver Award by having five or fewer violations out of a possible 4,787 total compliance checks in 2013.

Given the heavier than normal rain events in the last few years, these awards are a great achievement for Plant Operations employees.



Eastbridge Wastewater Treatment Plant

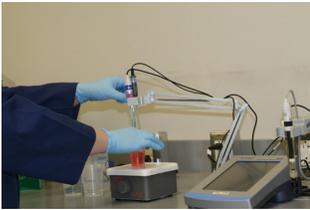


Water Quality Analysis

KUB'S WATER QUALITY LABORATORY PLAYS AN important role in ensuring the quality of KUB's biosolids product. The laboratory performs approximately 100,000 tests a year to protect water quality and the environment. In addition to the monitoring and testing required by the National Pollutant Discharge Elimination System (NPDES) permits for our wastewater plants, the lab tests samples collected at various stages in the treatment processes to ensure optimum plant performance. It also performs analyses on KUB's Class B Biosolids product that is land-applied.



KUB's laboratory is a 10,000 square foot state-of-the-art facility with the capability to perform over 50 test methods. The lab is certified by the state of Tennessee to perform analyses for over 150 potential contaminants.



Lab personnel must adhere to regulatory sampling protocols related to collection techniques, preservation, and holding times to ensure the quality and defensibility of the analytical data. Physical, chemical, and biological testing capabilities help KUB protect the plant from receiving contaminants that would be difficult to treat. The lab analyzes discharge samples collected from industrial customers to be sure those facilities are complying with pretreatment permit limits. It also routinely tests both the influent to the wastewater plant, the plant effluent, and the final biosolids product to ensure the required quality and demonstrate compliance with standards.



The laboratory maintains state-of-the-art equipment such as ion and gas chromatographs, mass spectrometers, total organic carbon analyzers, and inductive coupled plasma spectrometers with mass spectral and emission detection capabilities. Automated flow injection analyzers for mercury, nitrogen, phosphorus, and ammonia are other analytical instruments on site.

Many of the tests are extremely sophisticated, requiring measurements in the parts per billion or lower, which is equivalent to finding a grain of sand in an Olympic-size swimming pool. Laboratory analysts have degrees in science or technology in addition to laboratory experience and training. They provide analytical services 365 days a year to support KUB and protect our community.

Application of KUB's Biosolids

KUB contracts with Synagro Technologies for land application of its biosolids. Synagro is the nation's largest recycler of organic residuals for water and wastewater residuals management.

Synagro's highly trained staff ensures that the company's work maintains compliance with applicable federal, state, regional, and local regulatory requirements. In addition to working to meet current standards, Synagro works with the EPA, NBP, biosolids associations,

and applicable regulatory agencies to be proactive in meeting changing regulatory requirements.

Fifty-three farms, comprising 4,622 acres, are approved for free biosolids land application by the Tennessee Department of Environment and Conservation. In 2013, Synagro applied 25,210 wet tons (6,292 dry tons) of KUB biosolids to 1,525 acres on 29 farms in Grainger, Jefferson, Knox, and Morgan counties.

What Are the Nutrients in KUB's Free Biosolids Worth?

KUB compared biosolids nutrients to three well-known chemical fertilizers (Urea, Phosphate, and Potassium Nitrate).

The Annual Market Value of Those Nutrients

Nitrogen	\$301,309
Phosphorous	\$522,539
Potassium	\$76,047



2013 Goals, Objectives, And Performance

THE KUB BIOSOLIDS ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) goals and objectives seek continual improvement and periodic review of programs, practices, and procedures. It's important when producing biosolids to begin with the end in sight. The long-term success of a biosolids program depends primarily on producing a consistent high-quality biosolids product. With that in mind, KUB's goals focus on:

- Producing a consistent product
 - Meeting the goal of improving environmental performance
- To meet those goals, KUB set two objectives designed to reduce trash in the plant processes and ultimately in the biosolids taken to the fields for land application.

Trash, such as plastics and other items that won't break down in the biological processes, comes into the headworks of the Kuwahee Wastewater Treatment Plant. KUB determined that increased removal was needed at the plant. Two new barscreens were installed that have increased the screening ability to remove more trash from the wastewater flow coming into the plant. Less trash is already being observed in the fields, according to Daniel Dodson, Technical Services Specialist for Synagro, KUB's biosolids contractor.

As a result of further testing of trash levels that do get to the digestion process, KUB implemented a schedule to clean one digester per year to further aid in the reduction of trash that could potentially end up in the biosolids product and in our environment.

KUB Contractor Performance Assessments

IN 2013, KUB CONTINUED TO USE a two-phase approach to quarterly contractor assessments, which ensures assessments are conducted at an active farm site and that the biosolids contractor is meeting contractual obligations to achieve the desired five key outcomes:

- Regulatory Compliance
- Environmental Performance
- Quality Biosolids Management Practices
- Relations With Interested Parties
- Safety

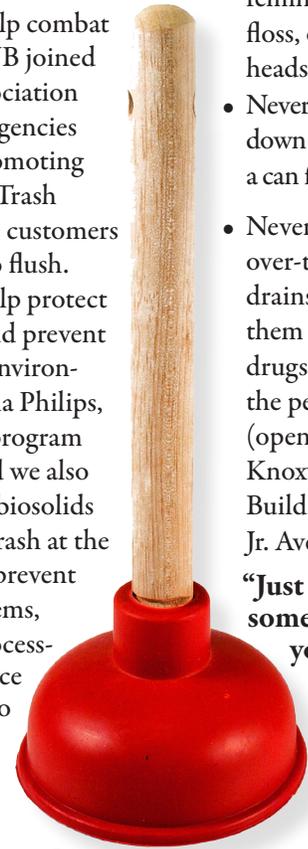
The assessment process checks that the biosolids contractor is following the appropriate guidelines and best management practices when applying biosolids. KUB selects a farm site and conducts an on-site assessment. The review checks that required documents are maintained on the site, set back requirements are met, and biosolids application rates at each field are correct. The review also checks for any offensive odors and to see if the stock pile is in good shape.

During the most recent assessment, the benefits of the biosolids were evident when you look at an area of a field which had the

Toilets Are Not Trash Cans!

KUB AND OTHER UTILITIES SPEND MILLIONS of dollars a year to clean products like "disposable" wipes out of wastewater pumps and other equipment. To help combat that problem, KUB joined the National Association of Clean Water Agencies (NAWCA) in promoting "Toilets Are Not Trash Cans!" to educate customers about what not to flush.

"We want to help protect our equipment and prevent overflows in the environment," said Adonia Philips, KUB's biosolids program coordinator. "And we also want to keep our biosolids clean. Reducing trash at the home level helps prevent equipment problems, helps all plant processes, and helps reduce trash all the way to the field."



KUB focuses on educating customers about these key points:

- Never flush rags, baby wipes, paper towels, shop towels, feminine products, dental floss, or disposable toilet wand heads.
- Never pour cooking grease down toilets or drains. Pour it in a can for disposal in the trash.
- Never flush prescription or over-the-counter drugs down drains or toilets to help keep them out of waterways. Take drugs to collection events or the permanent collection site (open 24/7) in the lobby of the Knoxville Police Dept. Safety Building, 800 Howard Baker Jr. Ave.

"Just because you can flush something doesn't mean you should,"

Phillips said. "We want customers to think before they flush."

biosolids spread just last December compared to the area with no biosolids. The area with biosolids is much greener than the adjacent area, as shown in the photo.

KUB also reviews the program requirements and standards as set by KUB and EPA in the 40 CFR Biosolids Guidelines. The KUB inspector reviews and ensures that all applicable permits and required documents are on file in the contractor's office. Those include truck reports, application rates, EPA Annual Reports, and documentation of any noncompliances. For the 2014 calendar year, there continue to be no issues with Synagro, KUB's biosolids contractor. Synagro continues to be a great partner with KUB in operating the biosolids program and ensuring the constant improvement of the program.



The area on the left shows the impact of biosolids application.

EMS/Biosolids Community Outreach

KUB USES THESE METHODS TO INFORM customers, the community, and interest groups about the KUB Biosolids Beneficial Reuse Program and EMS:

PACE 10 PARTNERS COUNCIL

KUB biosolids program staff periodically update the PACE 10 Partners Council on the program. The council, which represents various interest groups across the community, serves as a source of feedback and input on the program.

CUSTOMER COMMUNICATIONS

KUB shares biosolids information with the public through its website. The site provides an overview of the program, a whitepaper, goals, and objectives.

Other means of public communication include a biosolids brochure, a newsletter that mails to all customers, KUB's semi-annual report to the City of Knoxville, and a general handout that KUB executive staff

use at speaking engagements. KUB's Customer Information Center also is a resource for answering questions and providing materials to customers who call in.

COMMUNITY EVENTS

Biosolids staff and/or materials are available at various community events. Staff members also are available to speak at special events or meetings. Some of the events where information was available in 2013 included EarthFest and WaterFest.



Fast Facts

100 percent of KUB's biosolids are beneficially reused.

KUB's biosolids are certified as a fertilizer by the Tennessee Department of Agriculture.

KUB nutrient-rich biosolids are a free, environmentally friendly alternative to chemical fertilizers.

KUB has operated a Biosolids Beneficial Reuse Program for over 20 years.

KUB provides approximately 30,000 tons of material to local farmers as a fertilizer and soil conditioner annually.

Land application of biosolids takes place in all 50 states.

Biosolids Monitoring Requirements

BIOSOLIDS PRODUCED IN TENNESSEE ARE MONITORED for compliance based on the EPA Part 503 Biosolids Rule (40 CFR Part 503). KUB produces Class B Biosolids. Pathogen requirements are met by anaerobic digestion and monitoring the density of indicator organisms. Vector attraction reduction requirements are met by meeting a reduction of at least 38 percent volatile solids reduction.

Monitoring Category	EPA Part 503 Monitoring Frequency	KUB Monitoring Frequency
Pathogen Requirements	Once every 60 days	Monthly
Vector Attraction Requirements	Once every 60 days	Monthly
Regulated pollutant limits (metals)	Once every 60 days	Monthly
Total solids, pH	N/A	Monthly
Nutrients	N/A	Monthly

Note: Based on biosolids production of equal to or greater than 1,500 dry metric tons but less than 15,000 dry metric tons.

KUB Strengths Noted on Third-Party Interim Audits



DURING SEVERAL OF THE THIRD PARTY audits conducted to maintain certification of KUB's Biosolids program, the auditor noted KUB's biosolids dashboard as an industry best. KUB employee Scott Tipton, Plant Operations, developed the dashboard,

which gives operations personnel a visual snapshot of data points coming from the various solids processes. Operators use the data to quickly monitor and assess plant performance and as an additional tool for decision-making. An additional strength noted in the most recent audit conducted in 2013 was that KUB has an excellent understanding of how to use the corrective and preventive action process (CAPA). KUB also developed the CAPA system in

house as a tracking mechanism for action items that feed into the system from internal and third-party audits, management reviews, and other avenues. Appropriate action is determined and tracked, and once an item is deemed completed, it's reviewed and closed by a third party. The system was put into place to seek continual improvement of biosolids activities.