



2016 Biosolids Performance Report

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Our Mission:

Our mission is to act as good stewards of our communities' resources: utility assets, customer dollars, and the environment. We work to safeguard those resources and enhance their value for the people of the communities we serve and generations to come.

KUB's Biosolids Program Maintains Platinum Level Certification

In December 2016, KUB passed a four-day biosolids audit to recertify its Platinum status through the National Biosolids Partnership (NBP). The audit report stated, "KUB has an effective biosolids environmental management system that supports continual improvement in environmental performance, meeting regulatory compliance obligations, utilizing good management practices, and creating meaningful opportunities for public participation." The auditor was especially impressed with KUB's cooperative business relationship with contractor Synagro.

KUB's biosolids program first received NBP Platinum certification in 2011 and is one of only 34 certified programs nationwide. To maintain certification, it must continue to pass annual external audits.



Auditor Jon Shaver examines KUB biosolids at a land application site.

Historic Year for KUB Wastewater Treatment: Zero Permit Violations in 2016

Each of KUB's four wastewater treatment plants had zero violations in 2016. All KUB plants have a history of excellent performance with multiple awards from the National Association of Clean Water Agencies (NACWA) and the Kentucky-Tennessee Water Environment Association (WEA). With no violations out of a total of 18,360 compliance checks for all four plants, the performance data from 2016 shows the plants again meet NACWA and WEA awards criteria.

- **Eastbridge:**
0 violations; 4,804 compliance checks; treats 0.38 million gallons a day (MGD)
NACWA Platinum 11 Award, WEA Operational Excellence Award
Eastbridge first achieved NACWA Platinum status, awarded for no violations in five years, in 2010. It has qualified for Platinum status each year since.
- **Kuwahee:**
0 violations in 4,796 compliance checks; 25.34 MGD
NACWA Gold Award, WEA Operational Excellence Award
- **Fourth Creek:**
0 violations; 4,310 compliance checks; 5.25 MGD
NACWA Gold Award, WEA Operational Excellence Award
- **Loves Creek:**
0 violations; 4,450 compliance checks 2.3 MGD
NACWA Gold Award, WEA Operational Excellence Award

KUB Biosolids Program Participant Named Soil Health Champion

Farmer Harvey Young received the prestigious Soil Health Champion designation from the National Association of Conservation Districts (NACD). As the 2017 Champion, Young will raise awareness about the many benefits of soil health practices by building peer-to-peer relationships, speaking at public events, and serving as a voice of soil health in media.

Young has a very diverse operation. His 128 acres are comprised of several ponds, cattle grazing, hay and fescue production, and organic gardens. Young has been a participant in the KUB Biosolids Program for more than 15 years. His soil is closely monitored with routine sampling, including tests for soil organic matter, NPK (Nitrogen, phosphorus, and potassium), and estimated nitrogen release. According to Young, soil infiltration has improved, earthworms are plentiful, and there are no signs of erosion.

“Harvey Young exemplifies what it means to be a good environmental steward,” said Hannah Claytor, KUB Biosolids Program Coordinator. “He maximizes efficiency, while ensuring the longevity of his soil and other natural resources. KUB and Synagro are pleased to be able to provide biosolids to farmers like him.”



Harvey Young’s Farm

Class A vs. Class B: What’s the Difference?

The federal Clean Water Act Part 503 regulations identify two classes of pathogen reduction, as shown below. KUB produces Class B biosolids, which are also certified as a fertilizer with the Tennessee Department of Agriculture.

Class A:

Pathogens are reduced to a level similar to the native soil and environment. Class A biosolids products can be used on home lawns and gardens, parks and golf courses, and other places where public contact is likely. Class A biosolids products include composted biosolids, lime pasteurized biosolids, and fertilizer pellets.

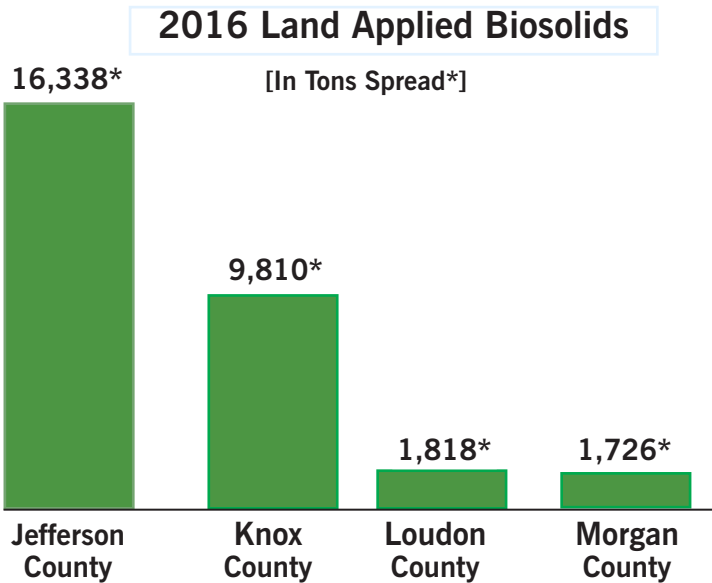
Class B:

While pathogens are significantly reduced to levels that are often below those found in animal manures, additional best management practices (BMPs) are required at the site where they are used. Class B biosolids are used in bulk as fertilizers in agriculture and forestry and to reclaim barren lands. Site permits are required for Class B biosolids use.

KUB Biosolids Application

KUB beneficially reuses 100 percent of its Class B biosolids. KUB contracts with Synagro Technologies for dewatering, transportation, and land application. Synagro’s highly trained staff ensures that the company’s work complies with applicable federal, state, and local regulatory requirements. In addition, Synagro works with the Environmental Protection Agency, National Biosolids Partnership, and applicable regulatory agencies to be proactive in meeting changing rules and regulations. KUB appreciates the excellent service Synagro provides to us and our customers.

In 2016, 22 farms received over 29,000 tons of biosolids. As shown in the figure, Jefferson County received the largest amount of biosolids. KUB currently land applies at 53 farms permitted by the Tennessee Department of Environment and Conservation.



2016 Goals, Objectives, and Performance

The KUB Biosolids Environmental Management System (EMS) goals and objectives seek continual process improvement and enhance biosolids quality. The program goals reinforce KUB's commitment to being environmentally responsible and supporting the sustainability of natural resources.

In 2016, KUB achieved the following:

- Developed and implemented an Operator Qualification training program to help promote consistency and safety of KUB Plant Operators
- Cleaned out two digesters to improve biosolids quality and optimize methane production
- Evaluated the performance of our chemical use to increase efficiency and better manage customers' dollars
- Developed a Solids Process Control Manual
- Evaluated over 200 Work Instructions Documents for accuracy and ease of use

Some of KUB'S 2017 goals and objectives include:

- Work to establish an alternative biosolids storage location
- Increase the quantity and quality of content on the biosolids webpage
- Place informational signage around the wastewater plants located near greenways and hauled waste site
- Promote cross-training among operators

Improving Efficiency: Cleaning Anaerobic Digesters

If not cleaned periodically, it is estimated that digesters lose up to 50 percent capacity to grit, which results in poor digester performance and low solids retention time (SRT). Overloading, grit, trash, and lower detention times can all contribute to a digester's poor performance. That can make it difficult to meet stabilization requirements and can result in increased odor.

KUB is committed to regularly scheduled digester maintenance, as each of our five digesters are emptied and cleaned approximately every seven years. In 2016, we cleaned approximately 300 tons of grit from a digester.



How Do KUB Biosolids Results Compare to Regulatory Limits?

The table below shows the maximum concentration of each parameter allowed by the EPA 503 regulations in land application. In addition, the table shows how KUB's 2016 results compare to the limits.

Parameter	EPA Ceiling Limits	2016 KUB Data
Arsenic (ppm**)	75	7
Cadmium (ppm)	85	2
Copper (ppm)	4,300	284
Lead (ppm)	840	26
Mercury (ppm)	57	0.74
Molybdenum (ppm)	75	8.74
Nickel (ppm)	420	35
Selenium (ppm)	100	5
Zinc (ppm)	7,500	897

**ppm: parts per million. One part per million is equivalent to a single penny in \$10,000 of pennies.

Community Outreach and Interested Farmer Relations

KUB uses the following methods to inform customers, the community, and interested groups about the KUB Biosolids Beneficial Reuse Program and Environmental Management System:

Community Events

Biosolids staff and/or materials are available at various community events. Staff members are also available to speak at schools, special events, or meetings.

Customer Communications

KUB shares biosolids information with the public primarily through its website. The site provides an overview of the program, a whitepaper, and audit reports. Other means of public communication include a biosolids brochure, newsletters, KUB's annual environmental report to the City of Knoxville, and KUB's Business Education Series, which helps our employees understand biosolids so they can help answer customer questions.

Interested Farmer Relations

KUB's website (www.kub.org) offers a wealth of information about our biosolids program for farmers or other interested parties. It also offers links to more information from the National Biosolids Partnership, the National Association of Clean Water Agencies, the Water Environment Federation, and the EPA.

Farmers may call KUB's Customer Information Center (865-524-2911) or e-mail our Biosolids Mailbox at biosolids@kub if they have specific questions or are interested in scheduling a farm visit to determine eligibility for biosolids application. A representative will be in touch within five business days.

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.



Fast Facts

- 100 percent of KUB's biosolids produced in 2016 were land applied.
- KUB provides approximately 30,000 tons of Class B biosolids to local farmers as a fertilizer annually.
- KUB's biosolids are certified as fertilizer by the Tennessee Department of Agriculture.
- KUB has operated a biosolids beneficial reuse program for over 20 years.

Toilets Are Not Trash Cans!

KUB and other utilities spend millions each year to clean products like "disposable" wipes from wastewater pumps and other equipment. That's why KUB joined the National Association of Clean Water Agencies to promote "Toilets Are Not Trash Cans!"

"Reducing trash at the home level helps us protect our equipment, prevent overflows in the environment, and keep our biosolids clean," said Hannah Claytor, KUB's Biosolids Program coordinator. "It also helps our customers avoid clogged toilets."

- Never flush rags, baby wipes, paper or shop towels, feminine products, dental floss, or disposable toilet wand heads.
- Never pour cooking grease in toilets or drains. Pour in a can and put 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 in the lobby of the Knoxville Police Dept. Safety Building, 800 Howard Baker Jr. Ave.

