



2011 Biosolids Performance Report

May 2012

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NBP Awards KUB EMS Certification



"KUB's BIOSOLIDS PROGRAM IS ONE OF ONLY **34** nationwide and two in Tennessee to achieve National Biosolids Partnership (NBP) certification for its Environmental Management System (EMS)," said KUB Vice President Wayne Loveday. (Chattanooga has the other NBP certification.)

An EMS goes beyond environmental regulations to incorporate practices that support even higher standards for biosolids programs. The NBP [see *sidebar on page 2*] helps utilities improve the quality of biosolids management programs and promote public acceptance of biosolids use and disposal practices.

"Wayne Loveday was instrumental in KUB receiving EMS certification," said KUB Chief Operating Officer Bill Elmore. "He initiated the process and oversaw obtaining EMS approval."

Here is how Loveday describes the process that KUB followed in deciding to seek certification and what helped the process succeed:

"Ted Tyree, manager of Plants, told me about a book he read called *Good to Great*, by Janes C. Collins. Ted was applying its concepts to operations and maintenance, and the more I thought about it, the more I realized that the same could be applied to the biosolids program and the processes at the plants."

"We had long recognized internally that KUB has a strong biosolids program," Loveday said, "but there are always others who may believe that the program isn't beneficial. Our program has maintained full compliance with regulations and guidelines, but there have been some complaints over the years from neighbors especially about odors."

In 2009 KUB and Synagro, our long-term biosolids contractor [see *sidebar on page 2*], decided our program needed further assurance of full compliance to help people better

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What Is the NBP?

The National Biosolids Partnership (NBP) is an alliance between the National Association of Clean Water Agencies (NACWA) and the Water Environment Federation, with advisory support from the U.S. Environmental Protection Agency (EPA). It is a not-for-profit alliance formed in 1997 to advance environmentally sound and accepted biosolids management practices. It also seeks input on policies and priorities from biosolids producers, regulatory agencies, universities, the farming community, and environmental organizations.

NBP Awards KUB EMS Certification (Continued)

understand and accept biosolids use. We registered our biosolids with the State of Tennessee as a fertilizer, and we applied for NBP certification for our program.

“The NBP promotes the idea that continuous improvement is necessary to keep a program viable. Its concepts fit perfectly with what we wanted to do. We felt that if we moved forward with NBP certification, we would make valuable improvements and help shield the program from future complaints and concerns that might be raised by some elements of the environmental community.

“We tried to move forward with certification a couple of times, but other priorities got in the way. Finally, in 2009, we asked Adonia Phillips, Plant Operations, to take the lead in getting the program certification started once again. She assembled a team that made this attempt successful.

“What certification means to KUB is twofold, I believe,” Loveday said. “First the practice is sustainable as there are fewer reasons for someone to find a reason not to do it. Second the State of Tennessee is looking closely at those who have achieved certification and is considering exempting them from the newly drafted Rules for Land Application that will make it easier for KUB to continue being in compliance but recognizes the program’s excellence. It is a great endorsement from the State to show the amount of confidence it has in KUB’s program.

“In addition to complying with applicable state and federal regulations, biosolids producers who implement an EMS



Loveday said. “With NBP certification and guidance, KUB will also continue to strive to ensure the biosolids program uses the best management practices.”

KUB Wastewater Plants Win Awards for Outstanding Service



FOUR KUB WASTEWATER TREATMENT PLANTS won awards from the National Association of Clean Water Agencies (NACWA) for outstanding permit compliance in 2010. Eastbridge won a NACWA Platinum Award for having no violations in five years out of 4,792 compliance checks. Loves Creek won a Gold Award with no violations. Kuwahee (one violation) and Fourth Creek (two violations) each won a Silver Award for having no more than five violations. Kuwahee also won a KY-TN WEA Operational Excellence Award.

“There were over 18,300 compliance checks for all four plants in 2010. Out of 18,300 opportunities to exceed some permit limit, only three violations occurred,” said Ted Tyree, Manager, Plant Operations. “The success of the program is due to the hard work and attention to detail from our staff and employees.”

KUB is applying for the following 2011 NACWA Awards: a Gold Award for Kuwahee and for Loves Creek, a Silver Award for Fourth Creek, and a Platinum Award for Eastbridge. To win a Platinum Award, plants must have no violations within the current year and the preceding five years.



KUB Board Recognizes Synagro

AT ITS MARCH 15, 2012, MEETING the KUB Board recognized Synagro’s successful 20-year history with KUB’s biosolids program. KUB and the Board commended Synagro for its high standards of innovative thinking, professional customer service, and leadership in the biosolids industry.

Synagro [formerly Amsco] contracted for KUB’s biosolids land application program in March 1992. Its role evolved over the years from hauling and land application to include site identification, permitting, and the maintenance, and operation of the Kuwahee dewatering facility

“Our work with Synagro helped us achieve NBP certification,” KUB Chief Operating Officer Bill Elmore told the Board. “We want to formally acknowledge Synagro’s contributions and express our appreciation for a successful ongoing partnership.”

2010-2011 Goals, Objectives, and Performance

THE KUB BIOSOLIDS EMS GOALS AND objectives seek continual improvement and periodic review of programs, practices, and procedures. KUB established four EMS goals that are aligned with KUB’s four corporate objectives.

1. Goal: Best Management Practices

Progress: KUB continued to meet EPA 503(b) limits in 2011. The completion of the EMS dashboard allows personnel to monitor and optimize the key critical control points of the digestion process. Employee knowledge of wastewater treatment and the biosolids program continues to improve and broaden through annual training programs.

2. Goal: Improve Relations With Interested Parties

Progress: The PACE 10 Partners Council, a diverse group that represents the KUB service area, was periodically updated throughout the year on the EMS/biosolids status and progress towards the NBP certification of the program. KUB encouraged the group to provide feedback on any questions or concerns about the biosolids program. KUB EMS/biosolids information on the KUB website includes contact information to allow interested parties to obtain more information about the program. KUB provided information to the public at various community

events and to employees through displays, newsletters, and presentations.

3. Goal: Serve Our Community’s Growth

Progress: KUB registered its biosolids as a fertilizer with the Tennessee Department of Agriculture. KUB continues to maintain the registration in 2011.

4. Goal: Achieve a higher level of environmental stewardship and regulatory compliance

Pretreatment Program – Control accumulation of regulated 503(b) metals within the biosolids value chain.

Progress: No quarterly samples were required, because the only special waste loads were sludge from KUB’s Eastbridge Plant and totes of starch, which are not industrial waste. As needed, KUB will perform quarterly reviews of the analysis reports for special waste loads discharged at the hauled waste site for the wastewater metals and compliance data, which will be performed on a monthly basis with wastewater report reviews to ensure KUB meets or exceeds Plant Protection Criteria for regulated metals. Periodic reviews of new industries through business communications and windshield surveys will occur as needed to ensure this goal is achieved.

KUB Contractor Performance Assessments

In 2011, KUB implemented a two phase, quarterly contractor assessment by KUB personnel. The object of the assessment is to ensure that the biosolids contractor is following the contractual requirements based on the five key outcomes:

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

In phase I, the Land Application Site Inspection helps ensure the biosolids contractor is following the appropriate guidelines and best management practices when applying biosolids.

KUB selects an active farm site and conducts an on-site assessment. The review ensures the required documents are at the site, such as a copy of the site permit map book and spill

control plans. The inspector also checks for neatness, or any offensive odors, the biosolids application rates at each field, and to see if the stock pile is in good shape.

If the owner of the property is available, the KUB inspector asks if there are any concerns with the contractor. If the owner is not available at the site, the inspector calls the owner later.

In Phase II of the assessment, the Contractual Obligation Inspection, KUB 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 regulations are on file in the contractor’s office, which includes truck reports, application rates, EPA Annual Reports, and documentation

of any noncompliances. The inspector conducts a physical walkthrough of the dewatering building to determine if it is kept clean and neat.

To date, KUB has completed two assessments. There have been no issues, and the contractor has done an excellent job. Synagro has been very cooperative and has continued to partner with KUB to ensure sustained improvement of the biosolids program.



KUB Biosolids Program’s Environmental Management System Certification Celebration, May 16, 2012

In her remarks, WEF Deputy Director Eileen J. O'Neill [pictured at right] congratulated KUB on the strengths the auditor noted for KUB's EMS. The auditor stated that KUB's "biosolids dashboard," which provides an immediate visual indication about performance, may be a best practice for the industry. The auditor also noted that KUB participates in an active and effective pharmaceutical take-back program and uses a thorough Corrective/Preventive Action process.

On behalf of the National Biosolids Partnership (NBP), a voluntary partnership of the National Association of Clean Water Agencies, Water Environment Federation, and the U.S. Environmental Protection Agency, I congratulate you and your dedicated staff on the successful completion and certification of your Environmental Management System (EMS). Your facility is the 34th organization in the U.S. and second in Tennessee that has earned the NBP's "Seal of Approval" by leading the way to excellence through your EMS program.

—Catherine Gerali, Chair, NBP Steering Committee



Jerry Stewart (far right) represented Chattanooga's Moccasin Bend Plant, the first in Tennessee to receive NBP certification, at KUB's celebration. Also pictured (left to right) are Daniel Dodson (Synagro), Matthew Synder (Moccasin Bend), Stephanie Boruff (Synagro), Bill Bailey (Synagro), Wayne Loveday (KUB), and Harvey Young, a farmer who receives biosolids from KUB.

On behalf of the members of the National Association of Clean Water Agencies (NACWA), it gives me great pleasure to congratulate you and the biosolids team at the Knoxville Utilities Board on your successful certification with the National Biosolids Partnership's (NBP) Environmental Management System (EMS) Program.

Congratulations, again, to you and to all of the dedicated employees at Knoxville Utilities Board responsible for achieving this great success

—Ken Kirk, Executive Director NACWA



Representatives of the Water Environment Federation (WEF) and the National Association of Clean Water Agencies (NACWA) presented KUB its National Biosolids Partnership (NBP) Environmental Management System certification. Pictured from left are KUB Plants Manager Ted Tyree; WEF Deputy Director Eileen J. O'Neill, Ph.D.; NACWA Senior Director, Regulatory Affairs Chris Hornback; KUB Vice President Wayne Loveday, KUB CEO Mintha Roach, and KUB COO Bill Elmore.



CEO Mintha Roach read a resolution the KUB Board of Commissioners passed recognizing Synagro for its 20-year partnership with KUB and its contributions to the biosolids program. She presented Bill Bailey and Stephanie Boruff of Synagro with a copy of the resolution.



The KUB team that drove the certification process included members from Synagro and various KUB departments. Pictured from left are Stephanie Boruff and Daniel Dodson (Synagro); KUB employees Karen Carpenter (Underground Construction), Mary Brown (Regulatory Compliance), and Renee Henderson (Business Performance); KUB Plant Operations is represented by Biosolids EMS Coordinator Adonia Phillips, Josh Johnson, Faye Thacker, and Manager Ted Tyree.

Industrial Pretreatment Program

KUB reissued all Industrial Wastewater Discharge Permits in 2011. In the development and review stages, we placed greater attention on each industry’s potential to impact biosolids. We added Best Management Practices to several permits, such as submission of maintenance and cleaning documentation for equipment, Toxic Organic Management Plans, and reporting on disposal of pharmaceutical waste. The intent of the BMPs is to protect KUB and to gather more information about an industry’s impact to our system.

We also made several changes to our Waste Hauler Program in the last year. Haulers are now required to request permission to discharge any waste other than domestic. That gives us the opportunity to investigate and sample the waste, if necessary, to determine its compatibility with treatment. In addition, at the end of June 2012, haulers will be prohibited from discharging car wash waste at KUB to prevent any petroleum contaminated waste from entering the treatment plant.

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. Synagro works with the EPA, NBP, biosolids associations, and state and local regulatory agencies to stay abreast of federal, state, and local biosolids

regulations to be proactive in meeting regulatory requirements. Forty-six farms in the KUB area, comprising 5,079 acres, are currently approved for free biosolids land application by the Tennessee Department of Environment and Conservation (TDEC). In 2011, Synagro applied 23,179 wet tons or 6,084 dry tons of KUB biosolids to 1,461 acres on 19 farms. Synagro applied KUB biosolids in eight East Tennessee counties: Grainger, Jefferson, Knox, Loudon, McMinn, Meigs, Monroe, and Roane counties.



Medication Collection Program



KUB is a member of the Knox-Area Medication Collection Program. The program promotes education and activities to prevent residential customers from flushing unused medications down the drain or toilet. Other collection program partners include the Knox County Health Department, the Tennessee Department of Environment and Conserva-

tion, the City and County Solid Waste departments, the Knoxville Police Department (KPD), and the Metropolitan Drug Coalition. The program organizes quarterly collection events so customers in our area can bring in pharmaceuticals and over-the-counter medications for proper disposal. That prevents medications from entering the wastewater system and potentially affecting the quality of our biosolids product. Since the program began in 2008, it has taken in more than 5,000 pounds of unwanted medications.

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	\$347,285
Phosphorous	\$553,707
Potassium	\$187,708

KUB EMS Passes Third-Party Audit

DEKRA CERTIFICATION INC. CONDUCTED an independent Verification Audit of KUB’s biosolids management system in late 2011. Based on its findings, it recommended that the National Biosolids Partnership (NBP) certify KUB’s biosolids Environmental Management System (EMS), and KUB received NBP certification in December 2011.

- Audit Purposes:**
- Verify KUB’s EMS meets requirements of the National Biosolids Partnership’s EMS Program, in particular the 17 EMS Elements (audit criteria)
 - Confirm KUB’s program meets NBP expectations, with practices and procedures being performed as documented
 - Examine outcomes KUB is achieving through a systematic approach to managing its biosolids program

Audit Process: KUB requested the audit as part of its efforts to achieve NBP EMS certification. Twenty-nine KUB employees, six biosolids contractor employees, and seven interested parties participated in the third-party audit. The initial audit included a review of EMS documentation and an onsite audit at KUB facilities and biosolids use sites from August 29 to September 2, 2011. The scope of the audit included KUB’s complete biosolids program. DEKRA reviewed processes and activities KUB uses to manage its biosolids program to see if they conformed with NBP expectations and requirements of the NBP EMS Elements. DEKRA found two major nonconformances and eight minor nonconformances with respect to the audit criteria. KUB took corrective action that closed the two major nonconformances and seven of the eight minor nonconformances by DEKRA’s

follow-up audits on November 28 and December 19, 2011. DEKRA’s Lead Auditor approved corrective action plans for the one minor nonconformance that remains open. DEKRA will verify effective correction during the next third-party audit planned for October 2012.

Audit Conclusions: DEKRA stated that KUB’s biosolids management system:

- Supports continual improvement in environmental performance
- Meets regulatory compliance obligations
- Uses good management practices
- Creates meaningful opportunities for public participation

Outcomes The audit confirmed the following improvement outcomes within the past two years:

Biosolids Quality

- Biosolids dashboard provides real-time data monitoring plant operations.
- Improved operating consistency in product quality has increased efficiency and plant capacity.

Environmental Performance

- Use of centrifuge dewatering has reduced dewatering costs from \$1.5M/year to less than \$1M/year and resulted in improved quality (visually appealing, little or no odor). Cost reduction from energy efficiency and less chemical use.
- Application of biosolids on fields growing switchgrass that is subsequently used as biofuel is a sustainable use that avoids any possible controversy about livestock feed.

- Regulatory Compliance**
- Operations monitors performance monthly, although bi-monthly monitoring is all that is required, that allows predictive operation and more efficient response to potential problems.
 - KUB meets the Interested Party Relations requirement by updating its PACE 10 Partners Council. (See back page for more.)
 - Additional external communication channels (e.g. biosolids on website) has increased awareness and led to confidence about further external communication.
 - Relationship with contractor (Synagro) continues to improve. Cooperation in developing community relations, awareness of operating concerns.
- Strengths of KUB’s System:**
- The “biosolids dashboard” provides an immediate visual indication to operators (and others) about performance of the biosolids operation. This may be a best practice for the industry.
 - KUB has participated in an active and effective pharmaceutical take-back program for approximately three years, including cooperation between several public agencies.
 - KUB uses a thorough Corrective/Preventive Action process.



EMS/Biosolids Community Outreach

KUB STRIVES TO inform customers, the community, and interest groups about the KUB Biosolids Beneficial Reuse Program and EMS. The staff uses the following various resources and means of communications.

PACE 10 Partners Council

KUB's biosolids program uses the PACE 10 Partners Council as a source of feedback and input on the program. The council represents various interest groups across the community.

In 2011, KUB updated the council on achieving NBP certification and overall status of the biosolids program.

Customer Communications

KUB shares biosolids information with the public through the KUB web site. The web site not only provides an overview of the program but also a whitepaper, goals and objectives. And in late 2011, KUB posted information on receiving NBP certification.

Other means of public communication

include the KUB customer newsletter, a KUB biosolids brochure, and the KUB Customer Information Center.

Community Events

Biosolids staff and/or materials and displays are available at various community events throughout the year. Staff members also make themselves available to speak at special events or meetings. Some of the events where information is available include EarthFest, the Dogwood Arts House and Garden Show and Ag in the Classroom Farm/Field Day. In 2011, 836 Knox County school children attended the Ag in the Classroom event.



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 wet tons of material to local farmers as a fertilizer and soil conditioner annually.

Land application of biosolids takes place in all 50 states.

KUB's Internal Audit Process

KUB conducted an internal audit of its Biosolids Environmental Management System (BEMS) in November 2010 and issued a final report January 18, 2011. The audit team consisted of six KUB members.

The purpose of the audit was to determine if KUB was complying with National Biosolids Partnership (NBP) standards and the current KUB BEMS Manual. The EMS internal audit identified a number of strengths in the KUB program and several nonconformances and opportunities for improvement.

During the Third-Party Verification Audit in late 2011, the auditor commented that the audit report was well-written, especially for an agency new to the process. All nonconformances were submitted as Corrective or Preventive Ac-

tion Requests (CPARs) and placed within the Corrective Action/Preventive Action (CAPA) System.

The auditor also noted that the CAPA system was, "A robust Corrective and Preventive Action process available through the KUB Quality Systems Group. This process is voluntarily used to define the nature of a correction (containment) or corrective action. The latter requires cause analysis and closed loop action and verification. KUB intends that several problems/deficiencies be corrected through the process, including audit nonconformances." All nonconformances from the internal audit were contained and corrected.

Based on the results of the internal audit, KUB appears to be complying with its Biosolids Management Policy

and the National Biosolids Partnership Code of Good Practice. It is making progress toward achieving its biosolids program goals and objectives and closing past non-conformances.

Here are some of the identified strengths listed in the final report:

- All auditees were committed to the success of the biosolids EMS approval process and freely submitted suggestions for the continuous improvement of the BEMS program.
- The Communications Department created a very comprehensive and informative web site to communicate biosolids information.
- KUB employees, in several instances, were self-motivated and took the initiative in seeking to learn more about biosolids.