



Report
National Biosolids Partnership
Biosolids Management Program
Interim Audit

Knoxville Utilities Board
Kuwahee Wastewater Treatment Plant
Knoxville, Tennessee

Audit Dates: November 19 & 20, 2019

Audit Conducted By: DEKRA Certification, Inc.

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Report Date: December 5, 2019

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1. EXECUTIVE SUMMARY

DEKRA Certification, Inc. (DEKRA) conducted an independent third-party audit of the Biosolids Environmental Management System (BEMS) being used by the Knoxville Utilities Board (KUB) in managing its biosolids program. The audit was conducted onsite at KUB's request November 19 and 20, 2019 covering requirements of the National Biosolids Partnership (NBP) BMP Elements. The audit was an Interim Audit (#2-3) for continuing DEKRA Verification and NBP Certification.

Audit Purposes

This Interim Audit was conducted to:

- Verify that the Biosolids Environmental Management System (BEMS) being used by KUB meets National Biosolids Partnership (NBP) expectations and conforms with requirements of the NBP BMP Elements.
- Confirm that the KUB BEMS is functioning effectively, with practices and procedures being performed as documented.
- Examine outcomes KUB is achieving by using a systematic approach for managing its biosolids program.
- Verify the effectiveness of corrective action taken in response to open nonconformances from previous DEKRA third party audits.

Summary of Audit Activities and Results

DEKRA reviewed KUB's BEMS and audited that program for conformance with expectations and requirements of the NBP Biosolids Management Program Elements (audit criteria). The audit scope was consistent with NBP requirements, as stated in the NBP Auditor Guidance (2011).

No major nonconformances and no minor nonconformances with respect to the audit criteria were found during this audit.

Conclusions

Based on the results of this audit, DEKRA has determined that:

- Use of a management system approach is generating positive outcomes for KUB's biosolids program in the areas of regulatory compliance, environmental performance, quality practices and relations with interested parties.
- KUB biosolids practices are consistent with NBP expectations and meet requirements of the NBP BMP Elements, with one minor exception.
- No nonconformances from prior DEKRA audits remain open.

This audit has verified that the KUB biosolids management program meets NBP expectations and requirements and we recommend continuing certification within the NBP Biosolids Management Program.

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2. AUDIT DETAILS

2A. Agency Details

Agency Name: Knoxville Utilities Board, Knoxville TN (referred to as KUB in this report)

Number of Employees = 42

Biosolids Production Sites: Kuwahee Wastewater Plant, Knoxville, TN

Volume of Wastewater Treated = 25 MGD (average); design 44MGD, capacity 120 MGD

Biosolids Produced = 5,600 dry tons per year (all Class B)

Biosolids Use Options: 100% agriculture land application

KUB Biosolids Program

KUB manages their biosolids program using a “Biosolids Environmental Management System (BEMS) that is based on the NBP BMP Elements. The scope of the KUB BEMS includes activities within the full biosolids value chain, including Pretreatment, Wastewater Treatment and Solids Generation, Solids Stabilization, Dewatering, Biosolids Storage and Transportation and Biosolids Use. A contractor (Synagro) is employed for managing biosolids dewatering and transportation and use options.

Contractors Participating in Audit

Synagro (as observer)

Interested Parties Interviewed

The following interested parties were interviewed to verify the effectiveness of the Communications, Public Participation and Compliance processes.

Jim Jarnagin – Farmer (biosolids user) Knox County

2B. Audit Criteria

The KUB biosolids program activities were assessed against requirement of the NBP BMP Elements (July 2011) and the KUB BEMS.

2C. Audit Team

KUB authorized DEKRA Certification Inc. to conduct this third-party audit of their biosolids program. DEKRA is an accredited Third-Party Audit Company within the NBP Biosolids Management Program. Mr. Jon Shaver was the Biosolids EMS Lead Auditor on behalf of DEKRA. DEKRA and the auditor have an independent relationship with KUB that meets NBP criteria for Third-Party Auditors.

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2D. Audit Scope and Locations

The audit was consistent with NBP requirements for Interim Audits and the Scope of Work agreed by KUB and DEKRA. It was conducted to cover requirements of the NBP BMP Elements (July 2011), with special attention to practices and management activities that directly support biosolids-related operations, processes and activities.

The following processes were audited:

- 1) Biosolids Management System Dynamics Review:
 - Significant changes affecting biosolids program
 - BEMS changes (incl documentation)
 - Biosolids Policy (demonstrated commitment, including CoGP)
 - Effectiveness Reviews
 - Communications Program
 - Corrective & Preventive Action
 - Goals & Objectives
 - Internal Audits
 - Management Reviews
- 2) Process Audits:
 - Biosolids Preparation (incl stabilization, conditioning & handling)
 - Corrective and Preventive Action
 - Critical Control Points & Operational Controls
 - Emergency Preparedness
 - Plant Maintenance
 - Pretreatment (incl material from other locations)
 - Wastewater Treatment & Solids Generation
- 3) Examination of outcomes being achieved in the areas of regulatory compliance, interested party relations, environmental performance and quality practices

Notes:

- Transactions were tested to verify the continuing health of the BEMS
- Interested party interviews were conducted to verify the effectiveness of the Communications Program, and included interviews with a user of KUB biosolids.

2E. Audit Methodology

The audit was conducted by qualified auditors following guidelines stated in the NBP Auditor Guidance (August 2011). The auditor observed practices in place, interviewed key persons and reviewed pertinent documents and records using sampling techniques to assess the systematic performance of the process being audited and the consistency of biosolids management practices with written procedures. This audit is not a verification of compliance with any legal requirements applicable to biosolids practices performed by the agency or its contractors.

2F. Reference Materials

The following documents were used as references during this audit:

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KUB EMS Manual (November 2017)

National Biosolids Partnership "BMP Elements" (July 2011)

National Biosolids Partnership Biosolids EMS Third Party Auditor Guidance (August 2011)

National Biosolids Partnership Code of Good Practice

National Biosolids Partnership Manual of Good Practice

2G. Definitions of Audit Findings & Required Corrective Action

Major Nonconformance – a serious omission from requirements and/or other departure that represents, or could cause, a systemic failure, or the existence of multiple related minor nonconformances, or failure to effectively correct a nonconformance in a timely manner. For verification to continue, major nonconformances must be corrected and verified by third party audit within 90 days.

Minor Nonconformance – an isolated departure from requirements that does not represent a systemic failure. Minor nonconformances require timely and effective correction by the agency and verification by the third-party auditor during the next third-party audit.

Opportunity (for improvement) – a possible improvement in the management system based on audit observations. There is no obligation for action in response to these observations.

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3. SUMMARY OF AUDIT RESULTS

3A. Verification Conclusion

The Knoxville Utilities Board has been independently verified by DEKRA Certification, Inc. as having 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 and is in conformance with requirements of the National Biosolids Partnership Biosolids Management Program.”

We recommend continued Certification within the NBP Biosolids Management Program.

3B. Audit Findings – Nonconformances

Minor Nonconformance JS/19-01/15 NBP BMP Element 15 requires the organization to complete a written BMP performance report summarizing the performance of its BMP. The report shall provide summaries of internal BMP audit results. The 2018 Biosolids Program Performance Report does not include a summary of internal audit results.

3C. Status of Nonconformances from Previous DEKRA Audits

No major or minor nonconformances remained open from previous Dekra audits.

3D. Appeals

The NBP provides an appeal process for biosolids organizations and interested parties that disagree with the Verification conclusion of a third-party audit. The appeals process involves an Appeals Board; representing a balance of biosolids management interested parties, including an environmental advocacy group and wastewater industry professionals. An appeal must be submitted within 30 days of the Audit Company’s verification decision or interim audit decision. Information about the appeals process is available from the National Biosolids Partnership. Contact Mr. Patrick Dube at pdube@wef.org

3E. Agreements

KUB and DEKRA have agreed that the next audit, an Interim Audit, will occur by December 2020 (exact timing to be agreed in advance). That audit will be conducted by DEKRA as a Third-Party Audit. The scope will be consistent with NBP requirements and the Interim Audits Program that has been agreed by KUB and DEKRA.

3F. Additional Information

Further information about this audit and/or the National Biosolids Partnership BMP can be obtained from Knoxville Utilities Board by contacting Ms. Hannah Claytor at Hannah.Claytor@Kub.org.

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4. BIOSOLIDS MANAGEMENT PROGRAM DYNAMICS

Review of the biosolids management program dynamics and outcomes is conducted to verify that the biosolids management program is functioning effectively and generating positive outcomes (results) and that changes are being incorporated consistent with requirements. The following summarizes DEKRA's review of the dynamics of the KUB Biosolids EMS.

4A Significant Changes

No significant changes affecting the KUB Biosolids EMS have occurred since the previous Third Party Audit.

4B Revisions to the Management System

Minor changes were made in the KUB Biosolids EMS that did not significantly affect the management system.

4C Biosolids Policy Commitments

The KUB Biosolids Management Policy remains as previously approved. The Policy includes a commitment to meet NBP requirements, which by inference includes following the principles of the Code of Good Practice. Review of performance in meeting commitments made in that Policy demonstrated it has been incorporated into the Biosolids Management Program and that continual improvements are occurring.

4D Examination of Outcomes

The KUB Biosolids EMS is improving through the use of a systematic approach to managing biosolids activities. The following improvement outcomes within the past two years were confirmed.

Relations with Interested Parties

- Zero pretreatment significant noncompliances have occurred at SIUs in 2019 compared to 6+/year prior to 2018.
- An ad posted in local newspapers received positive response from the public.

Regulatory Compliance

- The Dental Amalgam Program initiated in 2019 is receiving good response. 75 of 100 written requests sent to dental offices have been returned with positive results. The remaining 25 are expected soon.

Environmental Performance

- A more consistent sludge is being created. Volatile solids reduction is continuing >50% for the year compared to only a few at that level prior to 2018.

Quality Practices

- The Preventive Maintenance Program at the plant is generating improved results. PMs are being identified and completed, a procedure for PMs has been approved.

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- The newly developed Project Close Out procedure is generating more internal understanding and allowing projects to finish well.

4E Interested Party Interviews

DEKRA interviewed 1 interested party during this audit, a farmer who uses KUB biosolids. That customer is pleased with the product supplied to them and the overall level of service and noted that good two-way channels of communication are in place. The process for interested party input and communications was found to be functioning effectively.

4F Use of NBP Certification and DEKRA Verification

Use of and references to NBP Certificate and DEKRA Verifications were reviewed. There were no concerns.

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5. BEMS EFFECTIVENESS REVIEWS AND PROCESS AUDITS

5a. Effectiveness Reviews

Communications Program

The KUB Communications Program includes proactive methods for communicating with interested parties, including the public and regulators. Communications occurs through public presentations and an interactive website. Interested parties interviewed during this audit noted that effective and useful channels of communication are in place..

Biosolids Goals and Objectives Process

Long term goals are set by management team addressing regulatory compliance, environmental performance, quality, relations with interested parties. Five objectives for 2019 and four objectives for 2018 have been completed. Two objectives are in progress and 2 have been deferred. These results demonstrate that the Goals and Objectives process is working effectively.

Internal Audits

Internal audits are planned for 2018 and 2019. The most recent audit conducted 10/1/19 covered most of the system. A finding and several "recommendations" from this audit are being addressed. The Internal Audit process is functioning effectively.

Corrective and Preventive Action Process

The Corrective and Preventive Action process was used to address nonconformances from previous Third-party Audits and internal audits. The process is working effectively.

Management Review

Management involvement has been demonstrated through actions taken regarding issues raised in management reviews and programs for measurement and improvement. The actions taken are consistent with defined objectives. Follow-up actions are recorded. The Management Review process is functioning effectively.

Process	Applicable BMP Elements	Conformance
Communications	6, 9, 15	Conforms, except as noted in Minor Nonconformance 19-01
Corrective Action	14	Conforms
Goals and Objectives status	5	Conforms
Internal Audits	16	Conforms
Management Review	17	Conforms

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5b. Process Audits

As part of this audit DEKRA audited the following processes that KUB uses within its biosolids management program and determined the level of conformance of each process with NBP expectations and requirements of the audit criteria.

Biosolids Preparation (incl stabilization, conditioning & handling) / Wastewater Treatment & Solids Generation

Operational controls are in place, including WIDs (Operating Procedures). Operator competence & skills are up to date. BMP objectives understood. Good focus on compliance with regulations and permits. Good communications with contractor that operates dewatering and arranges for biosolids transportation and use.

Corrective and Preventive Action

CAPA process used to address complaints, noncompliances and audit findings. Approximately 50 CAPAs since 2015. Completed actions verified and all CAPAs closed on time.

Critical Control Points & Operational Controls

Process Control Points and related Operational Controls identified and understood and reviewed and updated periodically. A "Project Closeout" process is used to plan changes in new / changed equipment.

Emergency Preparedness

A KUB Emergency Response Plan is in place. Plan addresses emergency situations for weather, chemicals, fire, serious injury and security. Equipment available to respond to emergencies. Personnel are trained.

Plant Maintenance

Maintenance focused on equipment reliability. Preventive maintenance done, with 80+% PMs completed on time. Working on developing predictive maintenance, including non-destructive testing. Maintenance WIDs in place.

Pretreatment (incl material from other locations)

Permitted SIUs inspected at least annually. NOV's addressed. Dental Amalgam control program started in 2019, with adequate response (75 responses out of 100 letters issued). Grease Control Program and Waste Haul Program in place. Septage haulers licensed.

Process	Applicable BMP Elements	Conformance

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Process	Applicable BMP Elements	Conformance
Biosolids Preparation (incl stabilization, conditioning & handling) Wastewater Treatment & Solids Generation	3, 10, 13	Conforms
Corrective and Preventive Action	14	Conforms
Critical Control Points & Operational Controls	3, 10, 13	Conforms
Emergency Preparedness	11	Conforms
Plant Maintenance	3, 10, 13	Conforms
Pretreatment (incl material from other locations)	3, 10, 13	Conforms

5c. Opportunities for Improvement

The following “opportunities” for improving the KUB BEMS were noted during the audit. Opportunities do not represent nonconformances and KUB has no obligation to take any action in response to them.

Communications

- Op 1. The roles and responsibilities of the primary contractor with biosolids activities (Synagro) are described in a Letter of Understanding. They could also be included in the KUB Communications Plan.
- Op 2. The term “stakeholders” is used throughout the KUB BEMS. That term could be defined to avoid confusion with similar terms being used (e.g. gatekeepers, interested citizens).

Pretreatment

- Op 3. Pretreatment programs used for operational control, such as the Grease Control Program and Waste Hauler Program, could more specifically describe potential environmental impacts that the programs are intended to control.

Operational Controls

- Op 4. WIDs for both Operations and Maintenance could include more description of environmental impacts being controlled.
- Op 5. Documents requiring control are expected to be kept up to date through periodic review and revision. The procedures for Hot Work Permit and Confined Space Entry have not been reviewed or revised since 2009. Consider making it a WID.

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Emergency Preparedness

Op 6. The BEMS description of the Emergency Preparedness Process could reference or list the various emergency plans in use, not an “example”.

Internal Audits

Op 7. Internal audit reports could be more concise and focus on conclusions that relate directly to the purposes of the audit.

Management Involvement

Op 8. The Management Review process could include more discussion of the suitability, adequacy & effectiveness of the BEMS, particularly key processes, such as compliance, communications, internal audits and corrective action.

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APPENDICES

List of Participants

The following persons participated in this audit. Other persons provided additional explanations, as necessary.

KUB Personnel

Brian Beaty	Program Technician
Alex Cawthern	Communications Analyst
Hannah Claytor	Business Management Analyst / BEMS Coordinator Plant Operations
Steve Clettenburg	Wastewater Operations Supervisor
Leslie Glover	Pretreatment Coordinator
Brittany Herman	Safety Specialist
Drew Iles	Analyst
Josh Johnson	Manager, Plant Operations
Craig Livesay	Maintenance Tech 3
Amy Mann	Regulatory Specialist
JR McCarter	Plant Maintenance
Stephanie Midgett	Communications Manager
David Obenschain	Business Management Analyst
Alex Owen	KUB Communications
Thomas Pucci	Wastewater Team Lead
David Rosecrance	Environmental Specialist

Contractor Personnel

Bill Bailey	Operations Manager (Synagro)
Daniel Dodson	Technical Service (Synagro)

Interested parties

Jim Jarnagin – Farmer (biosolids user) Knox County

List of Documents & Records Reviewed

BEMS Manual 11/17/17
Biosolids Management Policy (2.2 in Manual)
Biosolids objectives, 2019, 2018
Biosolids Performance Report 2018
CAPA records (various)
Classification description – Plant Operator
Communications Plan 11/12/19
E-mail string re communications June 25, 2019
Emergency Response Plan 7/1/11
Grease Control Program 2004
Hot Work Permit procedure 11/3/09

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Interested Parties Feedback Form 11/10/18
Internal audit report 10/1/19
Internal audits scope & schedule 11/19/18
Knox News article June 23, 2019
Letter of Understanding KUB / Synagro 3/15/10
Management review 11/6/19
Pass through violation summary 6/12/19
Post Application Survey 2019
Pretreatment Certification - Leslie Glover 1/29/19
Process control points & operational controls 11/12/19
Process description BEMS goals and objectives
Septage Waste Manifest 11/17/19
Start with Safety plan
TDEC report 11/11/19
Waste Hauler Program 6/13/17
WIDs for Maintenance (various)
WIDs for operations (various)

END OF REPORT