



**National Biosolids Partnership
Biosolids EMS Audit Report**

Interim Audit

**Kent County Department of Public Works
Dover, Delaware**

Audit Dates: November 16 to 19, 2009

Audit Conducted By:

KEMA-Registered Quality, Inc. (Chalfont, PA)

Audit Team: Mr. Jon Shaver, Certified Biosolids EMS Lead Auditor / Biosolids Auditor

Report Written By: Jon Shaver, Biosolids EMS Lead Auditor

Report Date: November 21, 2009

Reviewed By: Jim Newton, Kent County Dept Public Works



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1. EXECUTIVE SUMMARY

KEMA-Registered Quality Inc. (KEMA) conducted an independent audit of the environmental management system (EMS) being used by Kent County Regional Wastewater Treatment Facility (Kent County) in managing its biosolids program. The audit was conducted August 26 to 28, 2009 at the request of the National Biosolids Partnership and was interim audit #4 following verification of the Kent County biosolids program in October 2005.

The purposes of this audit were to:

- Verify that the biosolids EMS being used by Kent County conforms to expectations and requirements of the National Biosolids Partnership (NBP) *Environmental Management System for Biosolids*, comprised of 17 EMS Elements
- Confirm that the Kent County biosolids management program is functioning as intended, with practices and procedures being performed as documented.
- Examine outcomes Kent County is achieving by using a systematic approach for managing their biosolids program.

This audit was conducted as an integrated audit covering applicable requirements of ISO-14001 and OHSAS-18001 as well as NBP Biosolids EMS Elements.

During the audit KEMA reviewed several processes and activities used by Kent County in managing its biosolids program and assessed the conformance of these processes with expectations and requirements of the National Biosolids Partnership EMS Elements. This scope of the audit was consistent with the interim audit program agreed upon by Kent County and KEMA.

The audit determined that:

- The management system is generating positive outcomes, particularly in improved sustainability programs and practices.
- The Kent County biosolids management system meets requirements of NBP's EMS Elements with 5 minor exceptions (minor nonconformances).
- No nonconformances from prior third party audits remain open.
- Several "opportunities for improvement" were noted, particularly for improving the effectiveness of the management system.

Based on results of this audit, KEMA verifies that the biosolids management system being used by Kent County meets the expectations and requirements of the NBP EMS Elements and we recommend continuing certification of that management system within NBP's Biosolids EMS Program.

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2. AUDIT DETAILS

2A. Local Agency Details

Agency Name: Kent County Department of Public Works (referred to as Kent County in this report)

Number of Employees = 58

Biosolids Production Sites Audited: Kent County Regional Wastewater Treatment Facility, Milford DE

Volume of Wastewater Treated = 18 MGD (average)

Biosolids Produced = approximately 8000 dry tons per year (100% Class A)

2B. Audit Team

The National Biosolids Partnership assigned KEMA-Registered Quality Inc. to perform this audit on their behalf. Mr. Jon Shaver conducted the audit for KEMA. Mr. Shaver is certified by NBP as a Biosolids EMS Lead Auditor and Biosolids Auditor. KEMA and auditors have an independent relationship with Kent County Regional Wastewater Treatment Facility that meets criteria established by the National Biosolids Partnership for Third Party Audit Companies and Auditors.

2C. Audit Scope and Methodology

The scope of this audit covered parts of the Kent County biosolids program, which encompasses pretreatment, biosolids stabilization, storage and transportation and end use / disposition, with special attention to practices and management activities that directly support biosolids-related operations, processes and activities.

The audit included the following topics, consistent with NBP requirements for biosolids EMS interim audits and the overall audit program agreed to by KEMA and EWA.

1. Review of significant changes
2. EHSMS Documentation Review
3. Management System Dynamics / Effectiveness Review
4. Management of significant changes
 - EHS MS planning & public participation
 - Management involvement (incl Policy, management review)
 - Document control & recordkeeping
5. Process Audits:
 - Biosolids Storage & Transportation
 - Biosolids Use – Agriculture
 - Corrective & Preventive Action
 - Environmental aspects / impacts
 - OH&S hazards / risk assessment

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- Goals, objectives & targets
 - Internal audits
 - Laboratory
 - Maintenance – collection systems
 - Wastewater collection
6. Examination of outcomes being achieved by Kent County in the areas of regulatory compliance, interested party relations, environmental performance and quality practices.

The audit was conducted by interviewing key personnel involved in the Kent County biosolids program and each process, observing practices in place and reviewing pertinent documents and records. Interested parties were interviewed and transaction tests were performed to verify management system effectiveness. It was performed using sampling techniques in a manner that is consistent with the NBP Auditor Guidance (August 2007).

2D. 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. Major nonconformances must be corrected within 90 days for verification to proceed.

Minor Nonconformance – an isolated departure from requirements that does not represent a systemic failure. Minor nonconformances require timely and effective correction and verification by a Third Party Auditor.

Opportunity (for improvement) – possible improvement in the EMS based on auditor observations. There is no obligation for action in response to these observations.

2E. Reference Materials

The following documents were used as references during this audit:

- EWA EMS Manual (current version)
- National Biosolids Partnership “EMS Elements” (May 2002)
- National Biosolids Partnership Biosolids EMS Third Party Auditor Guidance (August 2007)
- National Biosolids Partnership Code of Good Practice
- National Biosolids Partnership Manual of Good Practice

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3. SUMMARY OF AUDIT RESULTS

3A. EMS Strengths

During this audit KEMA noted the following strengths in the Kent County biosolids management system.

- Kent County is an excellent example for sustainability efforts at wastewater treatment plants (e.g. reduced energy use, reduced manmade chemicals)...
- Several programs are being planned that will contribute significantly to improved EHS performance at KCRWTF.
- The internal audit performed in 2009 was concise, effective and provided useful findings.

3B. Outcomes

The Kent County biosolids program is improving through the use of their management system. The following outcomes within the past two years were confirmed.

Regulatory Compliance

Plans in place to reduce electric energy use via installation of photovoltaic panels, solar dryers. Expected result is 33% – 50% energy self sufficiency needs, reduce natural gas and resulting NOX by 25%

Environmental Performance

Sanitary sewer overflows reduced from 4 major spills in 2008 to 2 in 2009, resulting in 50% less untreated sewage entering local streams.

Addition of 3rd filter press resulting in dryer cake (from 17% to 21%), corresponding reduction in use of natural gas.

Quality Practices

Several programs introduced to improve employee health and safety, including Hazwoper training, respiratory protection testing and inspection, hepatitis B injections. OSHA IR reduced from 6 in 2008 to 5 in 2009.

Advanced technology for weirs being installed to reduce potential for algae and improve clarifier settling efficiency.

Plan to install floating weirs on plant outfall to enable equalization during rainfall events and increase storage.

Interested party Relations

Elevated water storage tank being installed to reduce pumping needs, improve fire suppression capability & reliability.

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Emergency response outreach program established with local response agencies, resulting in improved community emergency response capabilities.

3C. Nonconformances

During this audit, KEMA found five (5) minor nonconformances with respect to the audit criteria, as described below and in the "Audit Results" section of this report. Review of these nonconformances determined that they do not represent a systemic deficiency. KEMA's Lead Auditor reviewed Corrective Action Plans prepared by Kent County addressing each nonconformance and found them acceptable. The effectiveness of corrective actions will be verified during the next KEMA audit, currently planned for May 2010.

Minor Nonconformance JS/09-01

NBP EMS Element 3 requires that critical control points and operational controls be identified for all biosolids management activities.

Maintenance activities, laboratory activities and the landfill biosolids use option were not considered in analyzing environmental impacts and health and safety hazards and were not included in the identification of critical control points and operational controls.

Minor Nonconformance JS/09-02

NBP EMS Elements require progress in achieving objectives to be monitored and measured.

Some objectives and targets (e.g. TMDL results, energy reduction) are not being presented at management reviews in a measurable way.

Minor Nonconformance JS/09-03

NBP EMS Elements require a procedure be established, implemented and maintained for receiving, documenting and responding to relevant communication from external interested parties.

There is no documented procedure for receiving, documenting and responding to relevant communication from external interested parties and some inquiries (e.g. truck traffic, biosolids land permitting) and responses were not recorded.

Minor Nonconformance JS/09-04

NBP EMS Elements require control of management system documents.

Some SOPs in use are in "draft" form (i.e. no final approval), some (such as confined space entry procedure) have more than one version in place and some (e.g. EHSMS Manual) do not have pages identified, dated or numbered.

Minor Nonconformance JS/09-05

NBP EMS Elements require that management reviews the effectiveness of the management system.

Some management review records do not summarize EHS performance or information supporting assessment of performance.

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3D. Opportunities for Improvement

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

Biosolids Use - Agriculture

- Acknowledgement of consistency with a documented Nutrient Management Plan could help ensure biosolids are used correctly in land application.

Communications

- When complaints from the public are handled, recording feedback to the person complaining could help ensure confidence in KC’s handling of those inquiries.

Corrective and Preventive Action

- The EHSMS process for Corrective & Preventive Action could include the various ways that needs for corrective action are identified (e.g. complaints, incidents, SSOs), with an analysis of trends for all corrective action.

Contractor Control

- A written understanding document for contractors who will perform work on behalf of KCRWTF could help provide “right to know” and emergency response information and EHS rules / practices that the contractor is expected to follow.

Critical Control Points and Operational Controls

- The definition of critical control points used in the EHSMS could be more consistent with that used in the NBP EMS Element (i.e. include need to control EHS performance, regulatory compliance and relations with interested parties) to ensure best practices are considered.

Internal Audits

- Internal audit results could be presented in an Executive Summary that relates results to the purpose of the audit.

Maintenance

- The lockout / tagout procedure in use could be taken from “draft” status, be less general and include equipment-specific practices for controlling hazards.
- Maintenance Safe Work Practices, such as lockout / tagout, confined space entry, linebreaking, could be included as required operational controls in collection, treatment & production areas.

Management System Planning

- Long term “goals” for the EHSMS could be established for better understanding of what it is intended to achieve. Examples – prevent pollution, prevent injury / ill health, improve sustainability, ensure regulatory compliance, continual improvement.

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- The EHSS MS management of change procedure could include documentation of satisfactory completion of planning events, such as need for environmental and/or safety and health hazards review, communications, training, operational controls and provision for prestartup safety review.

Wastewater Collection

- Pump station wells could be labeled as confined spaces and require testing and perhaps permit before entry.

3E. Verification Statement

Based on the results of this audit, KEMA has verified the management system for Kent County biosolids management system continues to meet the expectations and requirements of the National Biosolids Partnership Biosolids EMS Program. Continuing certification within the NBP Biosolids EMS Program is recommended.

3F. Agreements

Kent County has developed written plans for correcting all nonconformances found during this audit. KEMA's Lead Auditor has reviewed those corrective action plans and determined that once effectively implemented they will correct the deficiency identified in the nonconformance. Kent County will implement the approved plans in a timely manner and KEMA will review the corrections within 6 months.

Kent County and KEMA have agreed that the next interim audit will occur in November 2010. That audit can be conducted as a third party audit and be an interim audit in order to coincide with plans for ISO-14001 and OHSAS-18001 Surveillance Audits in place. The scope will be consistent with the Interim Audits Program agreed by Kent County and KEMA. Kent County will make arrangements for that audit through the National Biosolids Partnership.

3G. Appeals

The NBP provides an appeals process for biosolids organizations and interested parties that disagree with the findings of a third party EMS audit. The verification 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 official verification decision or interim audit decision by the Audit Company. Anyone who may need help in understanding the appeals process should contact the National Biosolids Partnership staff, Mr. Eugene DeMichele at 703-684-2438, or by e-mail: edemichele@wef.org.

An appeal process is available to persons concerned about the methods and/or scope of this audit. Further information about this appeal process can be obtained directly from KEMA (contact Pierre Salle, pierre.salle@kema.com or Jon Shaver jon.shaver@kema.com) or from NBP (contact Eugene DeMichele, edemichele@wef.org).

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4. AUDIT OBSERVATIONS + RESULTS

The following describes the results of KEMA's audit of processes Kent County uses in managing biosolids activities and the level of conformance of each process with applicable requirements of the EMS Elements. Nonconformances remaining open are noted. Kent County has prepared Corrective Action Plans for those nonconformances and KEMA's Lead Auditor has approved those plans.

4A Significant Changes

The Kent County EHS Policy was modified in 2009 to include a commitment to sustainability. The change was communicated internally and objectives and targets were developed to address the new commitment.

Several significant changes are currently planned, some of which will be completed in 2010. These changes include:

- Elevating air supply piping
- Installation of new motor control equipment in biosolids production areas
- Transitioning from chlorine disinfection to UV
- Installation of an elevated water supply tank
- Addition of photovoltaic energy generation equipment (solar panels)
- Installation of floating weirs for controlling discharge water
- Installation of passive solar dryers
- Installation of equipment to recover waste heat from effluent water
- Replacement of weirs in clarifiers with stainless steel weirs

The above projects will be included in the scope of future audits at KCRWTF as they near completion.

4B Review of Open Nonconformances

No nonconformances from previous audits remain open. The effectiveness of action taken to correct nonconformances from the 2008 interim audit was verified in a Corrective Action Audit in January 2009.

4C Documentation Review

Kent County EHSMS Manual was reviewed and the following observations were noted. Kent County modified their manual in response to these findings.

- The scope statement for the EHS MS (section 1.1) is not consistent with ISO & OHSAS certificate.
- The decision whether to communicate externally about significant environmental aspects is not documented in the EHS MS Manual.
- The records noted in Appx G do not include records of Qualification (only training mentioned), Calibrations, Compliance evaluations, Management reviews

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- Some pages of manual not dated or identified, therefore it is not clear that they are approved.
- Section 1.5 of the manual does not specifically state what contractor services are provided as part of the biosolids program.
- The term “legal and other requirements” is used in section 2.2 of the manual and in Appendix C (list of legal and other requirements), however there is no discussion of what other requirements exist and how these are determined and controlled.
- Monitoring / measurement procedures are not documented, or stated vaguely, in the EHS MS Manual.

4D Effectiveness Reviews

Communications Program

Internal communications are done through staff meetings and posting on bulletin boards. An internal audit finding that awareness of the EHSMS could be improved was addressed so that several new personnel were trained. Public meetings (Levy Court) discuss Works Department plans and performance. A survey of biosolids users was conducted with no negative feedback received. Discussion with a biosolids user during this audit demonstrated that Kent County communication with users is effective. A discussion during this audit with a State Regulator demonstrated that Kent County communications with regulators is proactive and response to requests from regulators is responded to effectively.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements, except as noted below:

Minor Nonconformance JS/09-03

There is no documented procedure for receiving, documenting and responding to relevant communication from external interested parties and some inquiries (e.g. truck traffic, biosolids land permitting) and responses were not recorded.

Management Involvement

Staff meetings are held weekly to discuss current issues and ongoing plans, including projects. Performance is discussed. The Core Team, including several management personnel, meets quarterly to discuss EHSMS planning and progress towards goals and objectives and make any necessary changes in the management system

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements, except as noted below:

Minor Nonconformance JS/09-05

Some management review records do not summarize EHS performance or information supporting assessment of performance.

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4E Biosolids Storage & Transportation

Biosolids are produced on a regular basis and stored in a covered area onsite pending transportation to agriculture use sites. Transport vehicles are maintained by Kent County or a local mechanic. Biosolids information, including emergency response, is carried on each truck. Trucks carry spill cleanup equipment. Users sometimes pickup biosolids at the plant and vehicles are checked by the Ag Operations personnel to ensure they are properly equipped.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements:

4F Biosolids Use – Agriculture

Class A biosolids are used for agriculture land application as arranged with local farmers by Kent County. Kent County Ag Operations delivers and spreads material on the pre-arranged field. Personnel competence is ensured through experience and training. Users are required to have a Nutrient Management Plan in place and take regular training provided by the Delaware Dept of Agriculture. Kent County provides information to enable the user to confirm Nutrient Management Plan requirements are met.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements:

4G Corrective & Preventive Action

Various corrective action practices are in place, including Corrective action requests (CPAR) for noncompliances and nonconformances, incident investigations, SSO investigations and complaints. Each practice is treated separately, however all include investigation, cause analysis and action to correct or prevent the deficiency.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements:

4H Critical Control Points & Operational Controls

Critical control points for biosolids activities are identified as part of a risk assessment for environmental impacts and safety and health hazards. Significant environmental aspects, safety hazards, critical control points and related operational controls are listed as an Appendix to the EHSMS Manual.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements, except as noted below:

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Minor Nonconformance JS/09-01

Maintenance activities, laboratory activities and the landfill biosolids use option were not considered in analyzing environmental impacts and health and safety hazards and were not included in the identification of critical control points and operational controls.

4I Goals, Objectives & Targets

Objectives / targets for 2008 were achieved and new objectives, targets and plans have been developed by the Core Team. Several of these address sustainability commitments made in the EHS Policy. Progress in meeting objectives and targets is reviewed during quarterly Core Team meetings.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements, except as noted below:

Minor Nonconformance JS/09-02

Some objectives and targets (e.g. TMDL results, energy reduction) are not being presented at management reviews in a measurable way.

4J Internal Audits

Internal EHS MS audits are conducted periodically to assess the management system performance and consistency with policy requirements. KCRWTF personnel assigned by the EHSMS Coordinator conduct the audits and report results to the Core Team. Action plans are developed to address audit findings.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements, except as noted below:

4K Laboratory

A laboratory at KCRWTF is used to test biosolids, with results reported daily to operations personnel. A composite sample is tested offsite by a certified laboratory to ensure biosolids meet Class A requirements. DNREC has asked that sampling be consistent with maximum time requirements for e-coli, salmonella and metals and procedures were changed in response to that request.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements:

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4L Wastewater Collection (including Maintenance)

Wastewater from industrial and commercial users and residents is collected and pumped to KCRWTF. 84 pump stations exist and each is inspected at least weekly and any required maintenance is done in a timely manner to ensure proper operation. Pump stations are controlled using a SCADA system and callouts are identified and responded to immediately. "Major" sanitary sewer overflows have reduced from 4 in 2008 to 2 in 2009.

Audit Results

Review of the process described above found it meets NBP expectations and conforms to applicable requirements of the EMS Elements, except as noted below:

Minor Nonconformance JS/09-04

Some SOPs in use are in "draft" form (i.e. no final approval), some (such as confined space entry procedure) have more than one version in place and some (e.g. EHSMS Manual) do not have pages identified, dated or numbered.



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APPENDICES

List of Participants

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

<u>Name</u>	<u>Position</u>	<u>Organization</u>
Rheinhold Betschel	Assistant Works Director	KCRWTF
Mari Favres	Plant Secretary	KCRWTF
Mike Harrington	Maintenance Manager	KCRWTF
Hans Medlarz	Works Director	KCRWTF
Jim Newton	Environmental Program Manager	KCRWTF
Keith Powell	Acting Assistant Works Director	KCRWTF
Bill Vincent	Operations Supervisor	KCRWTF

Interested Parties

Alton Collins	Biosolids user / farmer	
Brian Churchill	Biosolids regulator	DNREC

List of Documents & Records Reviewed

Bid award memorandum 11-17-09	minutes (May 14 2009, Aug 17, 2009, Nov 5 2009)
Biosolids Program Performance Report 2008	Kent Connections Newsletter
CPAR (various)	Letter from DNREC 9-9-09 + response 10-29-09
Critical control points & operational controls	Lockout / tagout procedure 3/8/06
Day report (various)	Management of Change for PV solar system
Delaware State News article 11/15/09	Management Review minutes – October 27 2009, May 2009
DMRQA Final complete review 9-20-09	MSDS (various)
EHSMS Management Plan	Nonhazardous waste & transport permit 3-10-06
Environmental aspects / OHS hazards & risks analysis	NPDES lab performance evaluation 9-19-09
Equipment information spreadsheet (Maintenance)	Procedure for land application of Kentorganite
Incident report / callout (various)	SPCC Plan 8/5/09
Inquiries / Complaints report (various)	Spill control program 7-1-09
Internal audit report 11-6-09	SSO emergency protocol
KCRWTF Environmental, Safety & Health meeting	Training matrix

END OF REPORT