National Biosolids Partnership
Biosolids EMS Interim Audit Report

Camden County Municipal Utility Authority
Camden, NJ

Audit Dates: September 7 to 9, 2011 and November 23, 2011

Audit Conducted By: DEKRA Certification, Inc. (Chalfont, PA)

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

Report Written By: Jon Shaver

Report Date: December 5, 2011

Reviewed By: Andy Kricun, Camden County Municipal Utility Authority

Approved By: Pierre Salle, DEKRA Certification, Inc.

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1. EXECUTIVE SUMMARY

DEKRA Certification, Inc. (DEKRA) conducted an independent third party audit of the biosolids environmental management system (EMS) being used by the Camden County Municipal Utility Authority (CCMUA) in managing its biosolids program. DEKRA conducted the audit September 7 to 9, 2011 at CCMUA's request. A follow-up audit was conducted on November 23, 2011. This was interim audit #1 following DEKRA's Verification of the CCMUA biosolids management system in September 2010.

Audit Purposes

The purposes of this audit were to:

- Verify that the CCMUA biosolids management system continues to conform to National Biosolids Partnership (NBP) expectations and requirements of the NBP EMS Elements.
- Confirm that CCMUA's biosolids management system is functioning as intended, with practices and procedures being performed as documented.
- Assess the effectiveness of the CCMUA biosolids management system, including outcomes being achieved.

Audit Criteria

CCMUA biosolids processes were assessed against requirements of their biosolids management system and NBP EMS Elements (May 2002).

Audit Scope

Consistent with NBP requirements for interim audits, DEKRA reviewed the dynamics of the CCMUA biosolids management system and audited parts of that system... The scope of the audit was consistent with the interim audit program and Scope of Work agreed by CCMUA and DEKRA.

Summary of Audit Results

The audit determined that:

- No major nonconformances and two minor nonconformances remained open at the conclusion of this audit. Approved corrective action plans are in place to address each nonconformance.
- All nonconformances from prior third party audits have been effectively corrected.
- CCMUA's biosolids management system is generating positive outcomes.

Verification Conclusion

Based on results of this audit, DEKRA has verified that the CCMUA biosolids management system is functioning effectively and continues to meet expectations and requirements of the National Biosolids Partnership Biosolids Management Program, with minor exceptions. DEKRA's Verification of the CCMUA biosolids management system will continue for 12 months from the date of this audit. We recommend continuing certification within the NBP Biosolids Management Program.

2. AUDIT DETAILS

2A. Local Agency Details

Agency Name: Camden County Municipal Utility Authority (referred to as CCMUA in this report)

Facility: Delaware #1 Wastewater Treatment Facility, Camden NJ

Number of Employees (approximate) = 135

Volume of Wastewater Treated (approximate): = average 80 MGD

Tons of Dewatered Sludge Produced (approximate): approx 160 wet tons per year

Contractors Participating in Audit

Synagro Inc.

CCMUA Biosolids Program

CCMUA's Biosolids Program includes defined processes for Pretreatment, Wastewater Treatment, Solids Dewatering, Biosolids Storage and Transportation and Biosolids Use, including incineration, and landfill. CCMUA manages their biosolids program using a management system approach based on the NBP EMS Elements. CCMUA's primary goals for their biosolids management system, as stated in their EMS Manual, are to:

- Optimize water quality
- Optimize odor control performance
- Minimize costs

2B. Audit Team

CCMUA 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 led the audit on behalf of DEKRA. Mr. Shaver is certified by NBP as a Biosolids EMS Lead Auditor and Biosolids Auditor. DEKRA and the auditor assigned to this audit have an independent relationship with CCMUA that meets NBP criteria for Third Party Auditors.

2C. Audit Phases

The initial interim audit was conducted September 7 to 9, 2011. A follow-up audit was conducted on November 23, 2011 to verify effective correction of major nonconformances found during the initial audit (see Management System Dynamics discussion).

2D. Audit Scope and Locations

DEKRA conducted this audit at the Delaware #1 Wastewater Treatment Plant in Camden NJ. No offsite locations were audited during this interim audit. One contractor (Synagro) participated.

The scope of the audit included parts of the CCMUA biosolids program, with special attention to practices and management activities that directly support biosolids-related operations, processes and activities. The audit included the following, consistent with NBP requirements and the Scope of Work agreed by CCMUA and DEKRA.

1. Management System Dynamics (+ Effectiveness Reviews)
   - Management of Significant Changes
   - Biosolids Policy Commitments
   - Effectiveness Reviews:
     - Management Review Process
     - Corrective & Preventive Action Process
     - Goals & Objectives Process
   - Examination of outcomes being achieved in the areas of regulatory compliance, interested party relations, environmental performance and quality practices.
2. Process Audits
   - Biosolids Preparation (including stabilization, conditioning and handling)
   - Compliance (with legal & other requirements)
   - Control of Contractors
   - Corrective and Preventive Action
   - Critical Control Points & Operational Controls
   - Goals & Objectives (for improvement)
   - Internal EMS Audits
   - Management Involvement (incl biosolids policy, EMS planning, mgmt review)
3. Verification of effective correction of open nonconformances from previous Third Party audits (March 2011)
4. Interested party interviews

2E. Audit Methodology

The audit was conducted by qualified auditors following guidelines stated in the NBP Auditor Guidance (August 2007). 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. Interested parties were interviewed and transaction tests were performed to verify the effectiveness of the management system. This audit is not a verification of compliance with any legal requirements applicable to biosolids practices performed by the agency or its contractors.

2F. 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) – possible improvement in the management system based on audit observations. There is no obligation for action in response to these observations.

2G. Reference Materials

The following documents were used as references during this audit:

CCMUA EMS Manual (March 2010, updated August 2011)
National Biosolids Partnership "EMS for Biosolids" standard (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

2H. Additional Information

Further information about this audit and/or the National Biosolids Partnership Biosolids Management Program can be obtained from Camden County Municipal Utility Authority. Contact Mr. Andy Kricun (e-mail: andy@ccmua.org).

3. SUMMARY OF AUDIT RESULTS

3A. Verification Conclusion

Based on results of this audit, DEKRA has verified that the CCMUA biosolids management system is functioning effectively and continues to meet expectations and requirements of the National Biosolids Partnership Biosolids Management Program, with minor exceptions. DEKRA's Verification of the biosolids management system will continue for 12 months from the date of this audit. We recommend continuing certification within the NBP Biosolids Management Program.

3B. Strengths Observed

During this audit, DEKRA noted the following strengths in the CCMUA biosolids management system.

- The external communication program is functioning effectively resulting in much reduced odors complaints and positive view of CCMUA in local community.

3C. Audit Findings – Nonconformances Remaining Open

The following minor nonconformances were identified during the audit. CCMUA has prepared corrective action plans for each nonconformance and those plans have been approved by the Lead Auditor.

Minor Nonconformance JS 11-05 NBP EMS Element #14 requires documenting formal corrective action plans and tracking progress in completing these plans. Tracking of progress in completing corrective actions in response to nonconformances occurs informally in weekly meetings, however results are not recorded.

Minor Nonconformance JS 11-07 NBP EMS Element #5 requires that action plans be established for activities to achieve biosolids goals and objectives. While action plans are understood and communicated, they have do not always clearly designate schedules, milestones, resources, and responsibilities.

3D. Plans for Closing Open Nonconformances

CCMUA has prepared corrective action plans for each nonconformance remaining open from this audit. DEKRA's Lead Auditor has reviewed and approved those corrective action plans. The effectiveness of corrective actions taken will be reviewed during the next Third party Audit, which is currently planned to occur in September 2012.

3E. Audit Findings – Nonconformances Closed

During the initial onsite audit (September 7 to 9, 2011) DEKRA found nonconformances in the CCMUA management system that required correction. As a result, CCMUA took corrective action and DEKRA reviewed the effectiveness of that corrective action on November 23, 2011. The results of that review are described below.

Minor Nonconformance JS 11-01 CCMUA commits to follow the Code of Good Practices in their biosolids program. Gravity Thickener area has spilled materials on the floor that have not been cleaned in several days or weeks, hoses not put away and doors on equipment left open (despite instructions to close). This housekeeping is not consistent with principles in the Code of Good Practice.

> Corrective Action - CCMUA determined that this nonconformance was caused by inattention by operators and insufficient inspections by Supervisors. In response, CCMUA retrained operators and Supervisors in the need for housekeeping and need to close doors on equipment for efficient operation and to minimize odors. This nonconformance is now closed.

Major Nonconformance JS 11-02 NBP EMS Element #5 requires that biosolids program goals and objectives be measurable and that action plans be implemented to achieve these goals and objectives. Some of the biosolids "objectives" developed for 2011 do not have measurable targets or results (e.g. continue minimizing adverse impacts from odors…") and action plans have not been developed for achieving the biosolids objectives.

> Corrective Action - CCMUA determined that this nonconformance was caused by lack of understanding about measureable objectives. In response, CCMUA rewrote their biosolids objectives for 2011 to indicate measureable targets that can be used to determine the level of achievement. This nonconformance is now closed.

Minor Nonconformance JS 11-03 NBP EMS Element #6 requires public participation in plans for independent third-party audits. Except indirectly as part of Board Meetings, external interested parties were not advised of the current interim audit.

> Corrective Action - CCMUA determined that this nonconformance was caused by lack of understanding of the need to advise interested parties of upcoming audits. In response, CCMUA assigned responsibility for ensuring interested parties are advised of Verification and Interim audits. Notification of the Follow-up Audit on 11/23/11 was provided on the CCMUA website. This nonconformance is now closed.

Minor Nonconformance JS 11-04 NBP EMS Element #7 requires that contractor roles and responsibilities be defined in Service Agreements. No "letter of understanding" or similar agreement about EMS responsibilities is in place with one trucking contractor (Mount Construction).

> Corrective Action - CCMUA determined that this nonconformance was caused by misunderstanding of EMS requirement that hauling contractors need to meet. In response, CCMUA prepared a written agreement with Mount Construction that defines applicable responsibilities. This nonconformance is now closed.

Major Nonconformance JS 11-06 NBP EMS Element #16 requires that CCMUA maintain an internal audit program to periodically analyze its EMS. No internal audits have been performed in the past year, which is evidence that the internal audit program is not being maintained.

> Corrective Action - CCMUA determined that this nonconformance was caused by misunderstanding of purposes of internal audits and related requirements of the NBP EMS Elements and interim audits. In response, CCMUA conducted an internal audit on 11/17/2011 and developed a program for internal audits. This nonconformance is now closed.

3F. Opportunities for Improvement

The following opportunities for improvement in the CCMUA biosolids program were noted during the audit.

Management Involvement

- Responsibilities of the EMS Coordinator could include evaluating performance of the biosolids management system and reporting that performance to management.
- Information used in weekly meetings to monitor biosolids program performance could be presented in a way that allows comparison to demonstrate performance (e.g. charts, graphs).

Operations & Maintenance

- Several examples of incorrect use of lockout / tagout procedure were observed in the GBT area.
- Operations SOPs could include the purpose & scope of the procedure and environmental, quality, regulatory and interested party impacts being controlled.
- Operations SOPs could show review dates and be prepared in the same format.

Corrective & Preventive Action

- Use of the Corrective and Preventive Action process could be expanded to include investigation and correction of incidents / accidents, contractor issues and similar systemic deficiencies.

3G. Agreements / Next Steps

CCMUA will take action to correct each nonconformance found during this audit. Review of action taken will occur during the next Third party Audit.

CCMUA and DEKRA have developed an Interim Audits Program to cover audits of the Biosolids Management System in 2011, 2012, 2013 and 2014 (i.e. years between Verification and Reverification Audits). CCMUA has requested that DEKRA conduct required interim audits of their biosolids management system as Third Party Audits and will arrange for these audits with DEKRA.

3H. 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 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 date of this audit report. Further information is available by contacting the National Biosolids Partnership staff, Mr. Jim Cox by e-mail at jcox@wef.org.

An appeal process is available to persons concerned about the methods and/or scope of this audit. Further information can be obtained from DEKRA (contact Pierre Salle, pierre.salle@dekra.com or Jon Shaver, jon.shaver@dekra.com) or from NBP (contact Jim Cox, jcox@wef.org).

4. MANAGEMENT SYSTEM DYNAMICS + EFFECTIVENESS

Review of the management system dynamics and outcomes is intended to verify that the bioslids management system is functioning effectively and generating positive outcomes (results) and that changes are being incorporated into the system. The following summarizes DEKRA's review of the dynamics of the CCMUA biosolids management system.

4A Significant Changes

The following significant changes have occurred, or are underway, at CCMUA affecting their critical control points and biosolids EMS:

1. Biosolids drying equipment is being installed and currently being operated under manufacturer's direction. Intention is to have the equipment operated by a contractor (Synagro) under CCMUA supervision. This change will be audited during next Third party Audit following startup.
2. A biofilter has been installed with the purpose of further reducing odors. Audit of this instalation detrmined that operators are aware of operational controls and training has occurred.
3. An outreach initiative (Camden Green Infastructure Program) is underway. CCMUA participate with other local public entities. The program has received excellent feedback from regulators and the public.
4. Aeration has been improved through the instalation of vapor pressure swing absorption equipment. Operators are aware of controls needed.
5. The previous Assistant Executive Director has been appointed as Executive Director and has retained EMS Coordinator responsibilities.

Transaction tests on each of these changes as par of this audit determined that they have been implemented in a manner that is consistent with CCMUA Biosolids EMS requirements.

4B Management System and Documentation Revisions

Major changes to the EMS Manual, top-level documentation and major processes within the biosolids management system were reviewed. There were no structurally significant revisions. The manual continues to follow the NBP EMS Elements sequentially.

4C Examination of Outcomes

The CCMUA biosolids program is improving using their management system. The following outcomes within the past two years were confirmed.

<u>Environmental Performance</u>

Installation of biosolids drying equipment is proceeding (currently in startup). This equipment will reduce odors, lower fuel costs and reduce biosolids disposal costs by approximately $500K/year.

<u>Biosolids Quality</u>

The direct oxidation equipment is being upgraded to remove cryogenic oxygen and replace with vapor pressure swing absorption. This will significantly reduce the plant's carbon footprint by replacing need for natural gas with more energy efficient electrical equipment.

Regulatory Compliance

A biofilter has been installed to capture odors, significantly reducing the need for chemical scrubbers. The equipment is estimated to reduce chemical costs by $150K/year and reduce maintenance by $100K/year.. In addition, air emission levels, currently about one order of magnitude below regulatory limits will be reduced by another order of magnitude.

Interested Party Relations

The Camden Green Infrastructure, a partnership between CCMUA, Rutgers University and other local entities, has erected "Raingardens" in various locations throughout Camden. The gardens reduce flooding and lower storm water influent. The $70K cost returned $300K in government grants.

4D Biosolids Policy Commitments

The CCMUA Biosolids Management Policy remains as approved in 2009. The Policy includes a commitment to follow the principles of the NBP Cde of Good Practice. During this Interim Audit, DEKRA's Lead Auditor reviewed performance of CCMUA biosolids program and found biosolids activities to be consistent with commitments made in the Policy and the principles of NBP's Code of Good Practice.

4E Effectiveness Reviews

Biosolids Goals & Objectives

Biosolids Program goals are to optimize discharge water quality, optimize odor control performance and minimize costs. Progress is being made in achieving these goals. Specific objectives and action plans within each of these goals areas are established and being achieved.

Communications Program

A strong, proactive Communications Program continues, with good interaction and response with interested parties, particularly members of the public and local community groups. CCMUA initiated an effective "Green Infrastructure Program" with local stakeholders.

Corrective and Preventive Action Process

CCMUA uses its Corrective and Preventive Action Process to investigate and correct management system nonconformances, most of which are identified by internal and Third Party audits. Eight major nonconformances and four minor nonconformances found during the DEKRA Verification Audit were corrected within 90 days following that audit in September 2010. Two minor nonconformances from that audit were subsequently corrected (see "Closed Nonconformances" below).

Management Reviews

Reviews of ongoing biosolids activities are conduced weekly to plan activities and address any concerns, particularly about effluent quality and odors. Annual reviews are conducted by the management team to strategically plan operations and review biosolids program performance. Actions taken are consistent with EMS requirements.

4F Closed Nonconformances From Previous Third Party Audits

Corrective action taken in response to nonconformances from KEMA's Verification Audit of the CCMUA Biosolids Management System in May 2010 and the status of those nonconformances are sumarized below.

Minor Nonconformance JS/10-01/ 1 NBP EMS Element 1 requires an EMS Manual (or equivalent set) that describes policies, programs, plans, procedures, management practices in the EMS. The CCMUA"EMS Manual" is inconsistent with NBP requirements in the following areas:

- Records requiring control are not identified, except for monitoring & measurement activities.
- EMS Manual does not state or reference procedures for monitoring / measurement biosolids program performance at critical control points other than for compliance with regulations

Corrective Action – CCMUA determined that this nonconformance was caused by an oversight in EMS documentation. In response, CCMUA revised its EMS Manual to address the deficiencies noted. This nonconformance is now closed.

Minor Nonconformance JS/10-12/ 13 NBP EMS Element 13 requires that progress toward achieving biosolids goals and objectives be tracked. Although progress is tracked on an as required basis, there is no specific record demonstrating that CCMUA is tracking progress towards some of the biosolids objectives.

Corrective Action – CCMUA determined that this nonconformance was caused by a lack of understanding about recording progress. In response, CCMUA added a progress column to their list of objectives and recorded progress. This nonconformance is now closed.

Minor Nonconformance JS/10-14/ 5 NBP EMS Element 5 requires biosolids objectives to be specific and measurable. 3 of 11 biosolids objectives currently in place are not presented in a measureable way.

Corrective Action – This nonconformance was escalated to a major nonconformance since insufficient progress was made prior to the September interim audit. See review of Major Nonconformance 11-02 described in Section 3E of this report. This nonconformance is now closed.

4G Interested Party Interviews

During this audit, DEKRA interviewed representatives of the New Jersey Department of Environmental Protection (NJDEP), a Director of a local community association (Hearts of Camden) and a member of the CCMUA Board of Commissioners. All persons interviewed were positive about CCMUA's involvement with the public and the proactive public participation approach. A significant improvement in community outreach and in odor reduction has occurred in recent years. Minor compliance concerns were rapidly and effectively addressed. Complaints are responded to quickly.

4H Use of NBP Certification and DEKRA Verification

Use of NBP Certificate References and DEKRA's Verifications were reviewed. There were no concerns.

5. PROCESS AUDITS

The following describes the results of DEKRA's audit of processes that CCMUA uses in managing biosolids activities. Consistent with NBP requirements, only parts of the management system are audited during interim audits, such that the entire management system and all 17 EMS Elements are covered at least once during the four annual interim audits between Verification Audits.

5A Processes Audited

The following processes were audited for conformance with all applicable requirements of the NBP EMS Elements:

Biosolids Preparation (including stabilization, conditioning and handling)

Compliance (with legal & other requirements)

Control of Contractors

Corrective and Preventive Action

Critical Control Points & Operational Controls

Goals & Objectives (for improvement)

Internal EMS Audits

Management Involvement (incl biosolids policy, EMS planning, mgmt review)

5B Process Audit Results

Audit of the above process found they are functioning effectively, meet NBP expectations and conform to applicable requirements of the NBP EMS Elements, with minor exceptions noted below:

Minor Nonconformance JS 11-05 NBP EMS Element #14 requires documenting formal corrective action plans and tracking progress in completing these plans. Tracking of progress in completing corrective actions in response to nonconformances occurs informally in weekly meetings, however results are not recorded.

Minor Nonconformance JS 11-07 NBP EMS Element #5 requires that action plans be established for activities to achieve biosolids goals and objectives. While action plans are understood and communicated, they have do not always clearly designate schedules, milestones, resources, and responsibilities.

In addition, the following opportunities for improving this process were noted:

- Responsibilities of the EMS Coordinator could include evaluating performance of the biosolids management system and reporting that performance to management.
- Information used in weekly meetings to monitor biosolids program performance could be presented in a way that allows comparison to demonstrate performance (e.g. charts, graphs).

APPENDICES

List of Participants

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

CCMUA Personnel

Robert Cornforth	Director of Operations
Jack Connolly	Asst Director of Operations
Andy Kricun	Executive Director
Tom Mount	Asst Chief Operator

Other

Janet Miles	DB/Guiarino Project Engineer
Oleg Zonis	DB/Guiarino Project Engineer
Ed Choromanski	Director – Air Quality, NJDEP
Ashit Dalal	Observer – DEKRA Certification
Herman Engelbert	Commissioner
Helene Pierson	Executive Director, Heart of Camden

List of Documents & Records Reviewed

Biosolids Policy
Biosolids Objectives – 2011 (updated)
CCMUA biosolids goals & objectives (2011)
CCMUA EMS Manual + various contents
CCMUA Pipeline newsletter
Contractor agreement 856011.13 032493
Corrective Action Plans for nonconformances
Critical control points table
Delaware #1 Status report Jan, Feb, March 2011
Goals & Objectives action plan update 11/22/11
Greenworks brochure
Internal audit procedure (3/9/10)
Internal audit report 11/17/2011
Laboratory analyses (various)
Management review reports (weekly) (various)
Monthly performance reports (various)
Raw sewage pumping 9/8/11
SOPs (various)
Staff meeting records 11/16/11, 10/27/11

END OF REPORT