Biosolids EMS Verification

Audit Report

City of Raleigh Municipal Utility Department

Raleigh, North Carolina

Audit Dates: February 6 to 10, 2012

Audit Conducted By:

DEKRA Certification, Inc. (Chalfont, PA)

Auditors: Mr. Jon Shaver, Biosolids EMS Lead Auditor

Report Written By: Jon Shaver, Biosolids EMS Lead Auditor

Report Date: February 21, 2012

Technical Content Review By: Marti Gibson, City of Raleigh Public Utilities Department

Verification Approved By: Pierre Salle, President - DEKRA Certification, Inc.

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1. EXECUTIVE SUMMARY

DEKRA Certification Inc. (DEKRA) conducted an independent Verification Audit of the biosolids management program being used by the City of Raleigh Public Utilities Department (CORPUD) in Raleigh North Carolina. CORPUD uses that program to manage its biosolids activities. The audit was performed at CORPUD's request as part of their participation in the National Biosolids Partnership (NBP) Biosolids Management Program. DEKRA conducted the audit in two phases, including a review of Environmental Management System (EMS) documentation and readiness review (phase 1) and an onsite audit at CORPUD facilities and biosolids use sites (phase 2).

The purposes of this Reverification Audit were to:

- Verify that the program being used by CORPUD in managing its biosolids activities meets requirements of the NBP Biosolids Management Program, in particular the 17 EMS Elements.
- Confirm that CORPUD's biosolids program is functioning effectively and in a manner that meets NBP expectations, with practices and procedures being performed as documented.
- Examine outcomes that CORPUD is achieving using a systematic approach to managing their biosolids program.
- Verify that effective corrective action has been taken in response to nonconformances from previous third party audits.

Consistent with NBP requirements, the scope of this audit included CORPUD's complete biosolids management program, including all activities within CORPUD's biosolids value chain. During the audit, DEKRA assessed the processes and activities that CORPUD uses within that management program for conformance with NBP expectations and requirements of applicable NBP EMS Elements. Interested parties were interviewed to assess relations with interested parties. Transaction tests were conducted to assess overall system health and functionality.

Summary of Audit Activities and Results

One major nonconformance and five minor nonconformances found during this audit with respect to the audit criteria. CORPUD immediately took corrective action in response to the major nonconformance and subsequent review confirmed that nonconformance was effectively corrected. CORPUD has developed corrective action plans to address the remaining nonconformances and those plans been approved by DEKRA's Lead Auditor.

Audit Conclusions

The audit determined that:

- The CORPUD biosolids management program is functioning effectively and generating positive outcomes.
- The program meets NBP expectations and requirements of the NBP EMS Elements, with minor exceptions.
- All nonconformances from prior third party audits have been effectively corrected.

Based on results of this audit, DEKRA verifies that the CORPUD biosolids management program meets NBP expectations and requirements of the NBP EMS Elements. We recommend Certification of the CORPUD biosolids program within NBP Biosolids Management Program.

2. AUDIT DETAILS

2A. Agency Details

Agency Name: City of Raleigh Public Utilities Department, Raleigh NC (referred to as CORPUD in this report)

Biosolids Preparation Sites: Neuse River Wastewater Treatment Plant, Battle Bridge Road, Raleigh North Carolina

Number of Employees = 105

Volume of Wastewater Treated = 40 MGD (average); capacity 60MGD

Biosolids Produced = 16,000 dry tons per year (total Class A + B)

CORPUD Biosolids Program

CORPUD's Biosolids Program includes defined processes for Pretreatment, Wastewater Treatment and Solids Generation, Solids Stabilization, Dewatering, Biosolids Storage and Transportation and Biosolids Use (2 use options). Contractors are employed for managing biosolids transportation and use options. Biosolids use includes agriculture land application (Class A) and composting (dewatered sludge).

CORPUD manages their biosolids program using a management system approach based on the NBP EMS Elements.

2B. Audit Purposes, Criteria and Scope

Purposes

This audit was a Reverification Audit, as defined in the NBP Biosolids EMS Program. Its purposes were to:

- Verify the CORPUD biosolids management system meets requirements of the NBP EMS Elements.
- Confirm CORPUD is managing its biosolids program in a manner that meets NBP expectations, with practices and procedures performed as documented.
- Examine outcomes CORPUD is achieving by using a systematic approach to managing its biosolids program.

Audit Criteria

Requirements of the NBP EMS Elements (July 2011) and CORPUD's Biosolids Management Program (per EMS Manual).

Scope of Work

The scope of the audit included all parts of the CORPUD biosolids program, which includes pretreatment, wastewater treatment and solids generation, solids stabilization, dewatering, biosolids transportation, biosolids 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 and the Scope of Work agreed by CORPUD and DEKRA.

1. Review of CORPUD's EMS Documentation describing the CORPUD biosolids management system and its use.
2. Review of significant changes affecting the CORPUD Biosolids Management System that have occurred since the previous DEKRA audit.
3. Process Audits (covering requirements of applicable EMS Elements, including review of process effectiveness):
   - Biosolids Stabilization, Conditioning & Handling
   - Biosolids Storage & Transportation
   - Biosolids Use – Agriculture
   - Biosolids Use – Composting
   - Communication Program
   - Competency, Training & Awareness
   - Compliance
   - Control of Contractors
   - Corrective and Preventive Action
   - Critical Control Points & Operational Controls
   - Document Control & Recordkeeping
   - Emergency Preparedness
   - EMS Planning
   - Goals & Objectives Process
   - Internal EMS Audits
   - Maintenance
   - Pretreatment & Collection
   - Top Management involvement
   - Wastewater Treatment & Solids Generation
4. Examination of outcomes being achieved in the areas of regulatory compliance, interested party relations, environmental performance and quality practices.
5. Interested party interviews

<u>Biosolids Use / Disposition Sites Audited</u>

McGill Environmental Services, Chatham County NC (dewatered sludge used as raw material)
Ennis Farm, Johnston County NC (biosolids used in land application – agricultural amendment)

<u>Interested Parties Interviewed</u>

NCDENR
Biosolids user (farmer)
Neuse Riverkeeper

CORPUD publicly advised all interested parties in advance that this audit would occur and gave them the opportunity to participate in or observe the audit.

2C. Auditing Methodology

The audit was conducted by qualified auditors following guidelines stated in the NBP Auditor Guidance (August 2011). Using sampling techniques, auditors observed practices in place,

interviewed key persons and reviewed pertinent documents and records 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 was conducted as a systems audit and is not a verification of compliance with any legal requirements applicable to biosolids practices performed by the agency or its contractors.

2D. Audit Team

CORPUD authorized DEKRA Certification Inc. to conduct an independent Third Party Audit of their biosolids management system Mr. Jon Shaver led the audit on behalf of DEKRA. Mr. Shaver is certified as a Biosolids EMS Lead Auditor and Biosolids Auditor by the NBP. DEKRA asserts that both our firm and auditor each have an independent relationship with CORPUD that meets criteria established by NBP for Third Party Audit Companies and Auditors.

2E. Reference Materials

The following documents were used as references during this audit:

CORPUD EMS Manual (current version)
NBP EMS Elements (July 2011)
NBP Biosolids EMS Third Party Auditor Guidance (August 2011)
NBP Manual of Good Practice

2F. Definitions of Audit Findings and 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 DEKRA's verification to be issued.

Minor Nonconformance – an isolated departure from requirements that does not represent a systemic failure. Minor nonconformances require timely and effective correction. Verification of effective correction by a certified DEKRA auditor is necessary for DEKRA's Verification to continue.

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

2G. 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 approval date of this report. Information about the appeals process is available from the National Biosolids Partnership. Contact Mr. Jim Cox (703-684-2438, jcoxl@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 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).

2H. Additional Information

Further information about this audit can be obtained from CORPUD. Contact Ms. Marti Gibson (e-mail: Marti.Gibson@raleighnc.gov).

3. SUMMARY OF AUDIT RESULTS

3A. Verification Conclusion

Based on results of this audit, DEKRA issues the following Verification Statement concerning the CORPUD's biosolids management system.

The City of Raleigh Public Utilities Department 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 EMS Program."

3B. Strengths

DEKRA noted the following strengths in the CORPUD biosolids management program.

- Department Managers understand the benefits of using management system approach.
- "Industry Day" hosted by Pretreatment provides excellent opportunity for discussing how industrial users can help protect wastewater treatment plant operations and biosolids quality.
- The plant Headworks building is exceptionally clean and relatively odor-free.

3C. Audit Findings – Nonconformances Remaining Open

During this audit, DEKRA found 1 major nonconformance and 3 minor nonconformances with respect to the audit criteria. Following the audit, CORPUD took immediate corrective action in response to the major nonconformances (see Section 3D below).

The following minor nonconformances found during this audit remain open. DEKRA's Lead Auditor has approved Corrective Action Plans that CORPUD prepared in response to those nonconformances. DEKRA will verify the effective correction of each nonconformance during the next Third Party Audit (see Agreements). The nonconformances remaining open are listed below, with reference to the applicable EMS Element.

<u>Minor Nonconformance JS 12-01 / 3</u> The CORPUD BMS (glossary) states that "process control points" include those where quality can be controlled. Although quality related requirements are noted in some parts of Appendix 3.2 identifying critical control points & operational controls, that list does not specifically reference Biosolids Quality requirements.

<u>Minor Nonconformance JS 12-02 / 5</u> NBP EMS Element 5 requires that biosolids goals and objectives for improvement be set for each NBP outcome area. Although some objectives in place for 2012 have a regulatory component, there are no biosolids goals or objectives that specifically relate to improving regulatory compliance.

<u>Minor Nonconformance JS 12-03 / 5</u> NBP EMS Element 5 requires biosolids program goals and objectives to be specific and measureable. At least five of 17 objectives in place for 2012 are not measureable, except generally (e.g. develop outreach program, control fine particulate emissions, evaluate bagging).

3D. Audit Findings – Nonconformances Closed Following Audit

During the initial onsite audit (February 6 to 10, 2012) DEKRA found one major nonconformance with respect to the audit criteria in the CORPUD biosolids management system. As a result, CORPUD took corrective action and DEKRA reviewed the effectiveness of that corrective action. The results of that review are noted below

Major Nonconformance JS 12-04 / 10 NBP EMS Element 10 requires that operational controls include appropriate preventive maintenance procedures and work management systems. Maintenance has not been included in the identification of critical control points and operational controls within the CORPUD biosolids program.

Corrective Action – CORPUD determined that this nonconformance was caused by a management error in not including maintenance as part of operational controls. In response, CORPUD revised their identification of operational controls to include Preventive Maintenance and Maintenance procedures that are in place. This nonconformance is now closed.

3E. Agreements

CORPUD and DEKRA will develop an Interim Audits Program to cover audits of the CORPUD Biosolids Management Program over the four years between Reverification Audits. These interim audits will be conducted to verify that CORPUD's biosolids management system is functioning effectively and continues to conform to NBP expectations and requirements. Interim Audit #2-1 will occur in January 2013 and will be a third party audit. The dates and scope of work for that audit will be agreed by CORPUD and DEKRA in advance.

4. BIOSOLIDS MANAGEMENT PROGRAM DYNAMICS

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 CORPUD's biosolids management program.

4A Review of Documentation and Readiness for Onsite Audit

The CORPUD Biosolids EMS Manual documents requirements and procedures within their biosolids management program. DEKRA reviewed that documentation as part of this Reverification Audit. DEKRA reported the results of that review to CORPUD in advance of the onsite audit. In response to that report, CORPUD made clarification changes in their Biosolids EMS Manual.

Based on our review of CORPUD's Biosolids Program Documentation and knowledge of their biosolids program from previous audits, DEKRA determined that CORPUD was ready for the onsite part of this audit.

4B Significant Changes

No structurally significant changes affecting the CORPUD biosolids management program have occurred since the previous Third Party Audit. A new BMS Coordinator has been appointed.

4C Revisions to the Biosolids Management Program

No structurally significant revisions have been made in the CORPUD Biosolids Management Program since the previous Third Party Audit.

4D Examination of Outcomes

The CORPUD biosolids management system / program is improving through the use of a systematic approach to managing their biosolids activities. The following improvement outcomes within the past two years were confirmed.

<u>Environmental Performance</u>

Sanitary sewer overflows have reduced from approximately 95 to approximately 35 in the past 8 years.

<u>Quality Practices</u>

Management system planning and discussion has improved inter-Division communication, improving efficiency and making more resources available.

Expanded use of the Management of Change procedure has improved planning and communication of changes.

The internal audit process developed as part of the management system is being used to find deep causes of operating problems.

<u>Regulatory Compliance</u>

An EPA audit in 2011 found no negative findings or comments within the treatment plant operations.

<u>Interested Party Relations</u>

Actuators have been installed on louvers in the blower room and sound blankets have been installed on blowers to reduce noise in response to public requests.

Recognition for the management system has increased Wastewater Division credibility to a point where it is being used as an example for management system development throughout the Department.

4E Correction of Open Nonconformances from Previous Third Party Audits

Corrective action taken in response to nonconformances from the DEKRA's Interim Audit of the CORPUD Biosolids Management Program in December 2010 and the status of those nonconformances are sumarized below.

Minor Nonconformance JS/10-01/Element 11 EMS Element 11 requires emergency response equipment to be readily available. A truck being loaded on Dec 9 with intention of transporting biosolids to the McGill composting site did not have any spill control equipment and the required spill response plan was not available.

> Corrective Action – CORPUD determined that this nonconformance was caused by incomplete approval of SOPs and lack of removal of obsolete versions. In response, CORPUD reviewed and approved SOPs, issued instructions for contractors to remove obsolete versions from use and inspected various trucks to confirm that this was done. This nonconformance is now closed.

Minor Nonconformance JS/10-02/Element 12 EMS Element 12 requires the organization to establish document control and records requirements for biosolids management activities conducted by contractors. Although required records are inspected, specific requirements for recordkeeping are not included in “special conditions” for contractors.

> Corrective Action – CORPUD determined that this nonconformance was caused by incomplete contractor requirements being documented and communicated to contractors. In response, CORPUD revised their Letter of Understanding with each contractor to include recordkeeping requirements. This nonconformance is now closed.

5. PROCESS AUDITS

The following outlines results of DEKRA's audit of each process used within the CORPUD biosolids management program and the level of conformance of the process with applicable requirements of the NBP EMS Elements.

5a. Summary

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

Process	Conformance with Applicable EMS Elements
Biosolids Stabilization, Conditioning & Handling	Conforms
Biosolids Storage & Transportation	Conforms
Biosolids Use – Agriculture	Conforms
Biosolids Use – Composting	Conforms
Communication Program	Conforms
Competency, Training & Awareness	Conforms
Compliance	Conforms
Control of Contractors	Conforms
Corrective and Preventive Action	Conforms
Critical Control Points & Operational Controls	Conforms, except as noted below
Document Control & Recordkeeping	Conforms
Emergency Preparedness	Conforms
EMS Documentation	Conforms
EMS Planning	Conforms
Goals & Objectives Process	Conforms, except as noted below
Internal EMS Audits	Conforms
Maintenance	Conforms
Pretreatment & Collection	Conforms
Top Management involvement	Conforms
Wastewater Treatment & Solids Generation	Conforms

5b. Audit Results

Audit of the processes listed above determined that they are functioning effectively and meet requirements of the NBP EMS Elements, except as noted below.

Minor Nonconformance JS 12-01 / 3 The CORPUD BMS (glossary) states that "process control points" include those where quality can be controlled. Although quality related requirements are noted in some parts of Appendix 3.2 identifying critical control points & operational controls, that list does not specifically reference Biosolids Quality requirements.

Minor Nonconformance JS 12-02 / 5 NBP EMS Element 5 requires that biosolids goals and objectives for improvement be set for each NBP outcome area. Although some objectives in place for 2012 have a regulatory component, there are no biosolids goals or objectives that specifically relate to improving regulatory compliance.

Minor Nonconformance JS 12-03 / 5 NBP EMS Element 5 requires biosolids program goals and objectives to be specific and measureable. At least five of 17 objectives in place for 2012 are not measureable, except generally (e.g. develop outreach program, control fine particulate emissions, evaluate bagging).

5c. Opportunities for Improvement

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

- The Goals and Objectives process description could note how biosolids goals and objectives are linked to Strategic Goals.
- The "status" of objectives could be specific to the objective, not necessarily the action plan steps.
- DOPs could include more reference to environmental performance, quality, interested party and regulatory requirements that require control within the procedure.
- The CMMS has data available that could be used to analyze maintenance trends, possibly leading to predictive maintenance.
- The FOG Program could be included in the list of critical control points for Pretreatment & Collection
- A document providing overall direction to the various emergency plans in use could help in organizing understanding, correct action and response.
- Investigation and planning of Corrective and Preventive Actions could include a section noting correction (i.e. immediate action to remedy the problem) and contributing factors (factors contributing to root cause).
- Risks associated with marketing / sale Class A compost made from CORPUD dewatered sludge could be analyzed and critical control points and operational controls established.
- Contractor use of "appropriate documents" could be assessed as part of inspections of the contractor.

- Language in contractor Service Agreement regarding use of CORPUD emergency plans could be more consistent with requirement in Letter of Understanding which requires contractor to have emergency plans approved by CORPUD.

APPENDICES

Appendix 1 List of Participants

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

CORPUD Personnel

Jeremy Blackman	Residuals Distribution Coordinator
John Carman	Director
Darrell Crews	Laboratory Supervisor
Marla Dalton	Reuse Coordinator
Winslow Davis	Operations Supervisor
Ryan Faw	Pretreatment Technician
John Gibson	Facility Manager NRWWTP
Marti Gibson	Environmental Coordinator / EMS Coordinator
Jesse Luper	Assistant Reuse Superintendent
Bruce Norris	Facility Maintenance Manager
Wade Shaw	Facility Manager - SCWWTP
Ken Waldroup	Asst Public Utilities Director
Jesse Walker	Facility Manager - DEB WTP
Jason Waters	Land Mgmt Supervisor
T.J. Lynch	Asst Public Utilities Director
Tim Woody	Reuse Superintendent

Contractor Personnel

Steve Cockman	McGill Environmental Services

Interested parties

Craig Ennis	Farmer - Ennis Farms (Johnston County)
Mandy hall	NCDWQ
Matt Fleahman	NCDWQ

Appendix 2 Documentation / Objective Evidence Reviewed

Biosolids Policy
CAPA records (various)
Centrifuge Operating Manual
Comprehensive Spill Containment Review 7/21/04
Contractor Inspection reports (various)
CORPUD Organization Structure
CCP Schematic
Critical Control Points & Operational Controls (list - table 3.2)
DENR Inspection report (1/31/12)
Documents requiring control (appx 12-1)
Effective Utility Management June 2008
Emergency Action Plan
Emergency Operations Plan
EMS Manual (January 2012

EMS Team meeting agenda & minutes (various)
Goals & Objectives 2012
Internal Audit report Sept / Oct 2011
Letter of Understanding (contractors)
Management of Change records (various)
MSDS (various)
Operator Audit Checklist 1-26-12
P&IDs (various)
Position Description - Plant Maintenance Tech
Records requiring control (appx 12-2)
Safety Manual
Safety Meetings 2011
SOPs (various)
SPCC Plan
Stakeholders Meeting agenda (12/7/11)
Stormwater Prevention Plan
Temperature Report batch 19120111
Wastewater Collection & System Treatment Report 2010-11
Wastewater Treatment Plant Metrics FY 08-09, 09-10, 10-11, 11-12, 12-13 (projected)
WUTAT Final Report

END OF REPORT