



NATIONAL BIOSOLIDS PARTNERSHIP

LOUISVILLE GREEN MANAGEMENT SYSTEM INTERNAL AUDIT REPORT

**LOUISVILLE & JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
LOUISVILLE, KY**

Audit Report Date December 06, 2019

Audit Conducted By Jennifer Garland-Waters, CICA
Kyle Sipes

Audit Date December 05, 2019

Report Written By Jennifer Garland-Waters, CICA



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AUDITOR'S OPINION STATEMENT

Louisville and Jefferson County Metropolitan Sewer District (MSD) continues its commitment to the National Biosolids Partnership (NBP's) Code of Good Practice and NBP Minimum Conformance Requirements for the 17 Elements ("Elements"). MSD's Louisville Green Management System ("LGMS" / "System") appears mature and functioning at a highly maintained level.

The results of this audit did not identify any major nonconformance issues. Since MSD received the NBP certification on July 31, 2008, MSD's System has undergone nine (9) third-party external audits and thirteen (13) internal audits.

1. SUMMARY

The MSD Internal Audit Team conducted the 14th Internal Audit of the System on December 05, 2019. MSD uses the system in managing its biosolids program at the Morris Forman Water Quality Treatment Center (MFWQTC).

The objective of this internal audit is to evaluate the effectiveness of the Metropolitan Sewer District's Louisville Green Management System, compliance with MSD's Biosolids Management Policy (effective October 23, 2017), and compliance with the National Biosolids Partnership's Code of Good Practice.

1A. AUDIT SCOPE

In accordance with NBP requirements for internal audits, the review included the following topics:

- Progress toward Goals and Objectives
- LGMS Outcomes
 - Environmental Performance
 - Regulatory Compliance
 - Relations with Interested Parties
 - Quality Biosolids Management Practices
- Actions Taken to Correct Minor Nonconformance
- Management Review Process
- Preventive Action Requests and Responses
- Corrective Action Requests and Responses



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The NBP has developed a blueprint that sets forth the important principles and goals which govern the operation of environmentally sustainable biosolids management systems. The 17 Biosolids Management Systems Elements were developed to define specific expectations and requirements. The NBP believes the elements to be environmentally sound and ensure the performance of the biosolids management activities in a publicly acceptable manner.

The following elements were reviewed to adequately address the NBP requirements included in the scope of the audit as listed above.

- **Element 1:** Biosolids Management Program (BMP) Manual
- **Element 2:** Biosolids Management Policy
- **Element 5:** Goals and Objectives
- **Element 6:** Public Participation in Planning
- **Element 9:** Communications
- **Element 14:** Nonconformances: Preventative & Corrective Action
- **Element 15:** Biosolids Management Program Report
- **Element 16:** Internal BMP Audits
- **Element 17:** Management Review

1B. SUMMARY OF AUDIT FINDINGS

The audit identified (1) positive observation, one (1) opportunity for improvement, and one (1) minor nonconformance. Audit results and management responses are in Section 4 of this report.

1C. REPORT DISTRIBUTION PLAN

Internal audit team members shall submit a Draft Internal Audit Report of their findings to the Process Support Supervisor within thirty (30) days of completion of onsite audit work. The Process Support Supervisor shall provide a corrective action plan to the lead auditor within thirty (30) days of the receipt of the draft report. The Lead Auditor shall provide a Final Internal Audit Report including the corrective action plan and management comments within ten (10) days of receipt of the corrective action plan.



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The Process Support Supervisor may distribute the Draft and Final Internal Audit Report to members of MSD management and staff as appropriate.

2. AUDIT DETAILS

2A. AGENCY DETAILS

Agency Name: Louisville and Jefferson County MSD
Address: 4522 Algonquin Parkway, Louisville, KY
Volume of Wastewater Treated: 120 MGD Average, 330 MGD Peak
Biosolids Produced: 7,800 dry tons per year (down from 18,000)
Number of Employees: 90

Contractors Audited: A-J Inc., Clarke and Alberta Fenimore; Sales Agent

MSD Internal Audit Team: Jennifer Garland-Waters, CICA – Staff Auditor II
Kyle Sipes – Staff Auditor I

Auditor Qualifications are in Appendix 5C.

2B. DEFINITIONS

Positive Observation: Recognition of an area in the biosolids management system that should be recognized for outstanding achievements and/or exceptional features.

Opportunity for Improvement: A program element that conforms to requirements outlined in the Elements, but which may be improved by following suggestions, examples, or benchmarks cited by the auditor.

Major Nonconformance: An issue that occurs when one of the elements in the Elements has not been addressed or has not been addressed adequately. Major nonconformances can occur when an organization has documented a process or procedure, but has not implemented it or cannot demonstrate effective implementation; when a number of minor nonconformance's in a given activity or element point to a systemic failure; when an element is being disregarded sufficiently during organization operations that it is having a noticeable effect on the organization's



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environmental compliance, environmental impacts, or the quality of the material being produced – there is a gap or problem that could lead to a systemic failure.

Minor Nonconformance: An issue that, when taken by itself, does not indicate a systemic problem with the Program. It is typically a random or isolated incident. Minor Nonconformance involves discrepancies within an element of the Elements that do not significantly affect the implementation of the Program and commitment to conform to the Code of Good Practice – a systemic problem is not indicated.

2C. REFERENCE MATERIALS

The following materials were used as a reference by the auditors during the internal audit:

- MSD LGMS Manual (2019 Version 2)
- NBP Third Party Verification Auditor Guidance Manual (effective August 2011)
- NBP Minimum Conformance Requirements for Elements #1 – 17
 - (Documented within the NBP Third Party Verification Auditor Guidance Manual)
- NBP Biosolids Management Program Guidance Manual (effective June 2011)
- NBP National Manual of Good Practice for Biosolids (effective January 2005)

3. EFFECTIVENESS REVIEW

In accordance with NBP audit requirements, the following topics were reviewed for the effectiveness of the System.

Progress Toward Goals and Objectives

The establishment and review of goals and objectives drive and guides the System’s continuous improvement efforts by defining the performance of the specific aspect that MSD, as well as its various interested parties, plan to target while aligning resources and efforts to maximize beneficial results. In developing program goals and objectives, the LGMS Management Team (“Management Team”) considers the critical control points of the biosolids management system, identified or potential environmental impacts, legal and other requirements, best management practices as defined by NBP, and input from interested parties. Goals and objectives are developed using SMART criteria (i.e., be Specific, Measurable, Achievable, Relevant, and Time-bounded), documented with an action plan, schedules, milestones, resources, and assigned responsibilities, and the Team meets monthly to evaluate progress and effectiveness.



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LGMS Outcomes

The NBP has identified four areas where it has defined specific, auditable expectations for examining outcomes as important indicators of biosolids management program health. These four areas include environmental performance; regulatory compliance; relations with interested parties; and quality biosolids management practices.

Environmental Performance

The System is required by NBP to identify goals and objectives to encourage continuous improvement. The Management Team redefines the goals and objectives to be consistent with the biosolids management policy as needed, assuring biosolids management activities comply with applicable laws and regulations, meet quality and public acceptance requirements, and prevent other unregulated adverse environmental and public health impacts by effectively managing all critical control points.

Regulatory Compliance

The System has established a robust compliance management system that effectively identifies and tracks regulatory compliance obligations, proactively identifies potential regulatory compliance issues, assures effective implementation of applicable compliance activities, quickly detects regulatory compliance problems, and addresses regulatory compliance problems in a timely fashion.

Relations with Interested Parties

The Management Team has set up quality, two-way flows of information with interested parties; giving the Team the capacity to understand the concerns and perspectives of interested parties. Conversely, this provides methods of effective communications to stakeholders and interested citizens regarding the key elements of the biosolids management system, including information about system performance.

Quality Biosolids Management Practices

In accordance with NBP's Code of Good Practice, the System has implemented good housekeeping practices for biosolids production, processing, transport, and storage, and during final use or disposal operations. The Management Team has implemented sustainable, environmentally acceptable biosolids management practices and operations. The Team identified best practices in the NBP National Manual of Good Practice, and from other sources such as industry benchmarking.

Actions Taken to Correct Minor Nonconformance

The Management Team is thorough in its efforts to document and address all noncompliance identified by internal and external auditors. The corrective action plans identify steps planned and taken to change policies, procedures, operational controls, and monitoring and measurement processes to prevent future nonconformance. Once the Team is satisfied that the corrective actions



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are sufficient to address the root cause of the issue and prevent a recurrence, the Team communicates the completed action plan with the internal or external auditor that issued the nonconformance to review and close out the nonconformance.

Management Review Process

The System undergoes annual Management Reviews conducted by members of MSD's Executive Management Team. This review includes monitoring and measurement data, progress toward goals and objectives, internal and external audit results, conformance to NBP Conformance Requirements, and the Biosolids Management Policy. To date, the participants have consistently provided quality input and recommendations for the improvement of the System.

Corrective and Preventive Action Requests and Responses

The establishment of a systematic process for preventing and responding to nonconformance is crucial to the effectiveness of a biosolids management system; facilitating continuous improvement and helps prevent issues from occurring or recurring. The Management Team has recently improved this process by redesigning the tools used to record and track nonconformances and associated corrective action plans. The Team meets monthly to review and track the progress of any open corrective action plans.

4. DETAILED AUDIT RESULTS

This section describes observations noted and categorized by Positive Observations, Opportunities for Improvement, Major Nonconformance, and Minor Nonconformance. The following observations were identified by the internal audit team while reviewing the Minimum Conformance Requirements outlined in the NBP Third-Party Auditor Guidance Manual.

Positive Observation

ELEMENT 15 – Biosolids Management Program (BMP) Report

Complete a periodic written Biosolids Management Program Performance Report (at least annually), summarizing the performance of the biosolids management program. The report shall contain appropriate summaries of monitoring, measurements and other results that demonstrate the performance of the biosolids program relative to its goals, objectives and legal requirements, including those biosolids management activities conducted by contractors. The report shall also provide summaries of performance relative to other voluntary adopted requirements, the organization's progress toward achieving its biosolids program goals and objectives, and a summary of its independent third-party verification audit results and internal BMP audit results.

Auditor: The dedication of the Louisville Green Management Team has led to achieving NBP double platinum-level certification. The Biosolids Management Program Performance Report



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shows effective management of the BMP process. Internal Audit noted the work the LGMS staff performs to keep the LGMS processes pertinent.

Opportunity for Improvement

Internal Audit acknowledges the hard work of the LGMS core team. However, the cost of maintaining the double-platinum certification versus a gold certification should be reviewed for cost savings.

Auditor: The Third-Party Audit costs between \$8,000 and \$12,000 for three external audits between verification audits. The gold certification requires external audits every 5 years. Consideration of the decreased profits from the biosolids products should be taken into account as well.

Management Response: Management will consider and evaluate suggestion to drop to a lower certification status.

Minor Nonconformance

ELEMENT 6 – Public Participation in Planning

Element 6 addresses the public participation requirements of the NBP BMP, including specific areas that must be included in the public participation approach, such as the commitment to the ten principles in the Code of Good Practice, as well as specific requirements for when public participation ought to happen, such as during development of BMP goals and objectives.

Auditor: The Process Support Supervisor did not send notice of the #14 Internal Audit to interested parties as outlined in Appendix 6B, point 2.

Management Response: A checklist has been prepared to help the Process Support Supervisor prepare for future internal audits to include notification of interested parties of upcoming audits.



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THIRD PARTY EXTERNAL AUDIT FOLLOW-UP

Minor Nonconformance

Requirement 4.2 – The standard requires that records of applicable legal requirements be established and maintained. The contractor, Clarke Fennimore, supplies Louisville biosolids to South Carolina and Arkansas but there were no applicable biosolids regulations available for those States in either Appendix 4A or in the contractor documents.

Status: Complete

Management Response: Information has been provided and electronically filed in the Contractor Folder for the current Marketer.

Opportunities for Improvement

Requirement 5.6 – Opportunity for improvement – Consider having the public relations personnel develop a goal and objective that directly relates to the “relations with interested parties” outcome area.

Status: Incomplete

Management Response: Emailed Sheryl Lauder, awaiting response.

Requirement 5.6 – Opportunity for improvement – Consider developing a goal and objective for the pretreatment program that directly relates to the “regulatory compliance” outcome area, for example, the dental amalgam program.

Status: Incomplete

Management Response: Emailed Adriane Ritman, awaiting response.

Requirement 5.6 – Opportunity for improvement – Consider developing a goal and objective for improving performance of maintenance management, such as improving the ratio of planned preventive maintenance activities to unplanned work order generated activities.

Status: Incomplete

Management Response: Emailed Rhonda Boyle-Crotzer, awaiting response.

Requirement 11.2 – Opportunity for improvement – Consider performing table top exercises to evaluate spill responses to various biosolids spills that have occurred in the past at Morris Foreman; additionally, consider having the emergency response team participate in responses to actual future biosolids spills at Morris Foreman.

Status: Incomplete

Management Response: JP Carstone is working on developing a tabletop exercise.

Requirement 11.2 – Opportunity for improvement - While Louisville conducts training and field exercises to evaluate the effectiveness of emergency preparedness and response procedures they



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do not prepare written post action reports addressing corrective actions required and preventive actions proposed to eliminate recurrence of problems.

Status: Incomplete

Management Response: Emailed TCombs and M Jones; awaiting further response.

Requirement 11.3 – Opportunity for improvement – Currently the location of emergency response equipment is not identified (e.g. a map).

Status: Incomplete

Management Response: In process of getting maps verified and updated.

Requirement 14.4 – Opportunity for improvement – The standard requires formal corrective action plans be established to address nonconformities identified during routine monitoring and measurement. Consider editing procedure 14 to include using the Hansen Maintenance Management System work orders to correct deficiencies identified during operations and routine monitoring and measurement.

Status: Complete

Management Response: Updated the Manual

Requirement 16.1 – Opportunity for improvement – The Random Site Inspection Form and the Random Hauler Inspection Form are used to provide information as part of the public participation in planning procedure. Consider using these forms to satisfy a part of the requirement to cover the internal audit of the biosolids management activities performed by contractors, and referencing them in procedure 16.

Status: Complete

Management Response: Site inspection was unable to be completed. Phone call was made to Ky user.



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5. APPENDICES

5A. LIST OF REQUESTED RESOURCES

- MSD LGMS Manual (2019 Version 2)
- NBP Third Party Verification Auditor Guidance Manual (effective August 2011)
- NBP Minimum Conformance Requirements for Elements #1 – 17
- NBP Biosolids Management Program Guidance Manual (effective June 2011)
- NBP National Manual of Good Practice for Biosolids (effective January 2005)

5B. LIST OF REVIEWED DOCUMENTS

- Contractor Requirements – Revision 5
Source: W:\DATA\EMS\EMS Manual\6. Operational Control\Contractor Control\Contractor LGMS Requirements
- Contractor Safety Training Manual – 2018
Source: W:\DATA\EMS\EMS Manual\6. Operational Control\Contractor Control\Contractor LGMS Requirements
- Appendix 4A, List of Legal and Other Requirements – Revision 023
Source: W:\DATA\EMS\EMS Manual\4. Compliance
- Appendix 4B, List of Permits and Licenses – Revision 014
Source: W:\DATA\EMS\EMS Manual\4. Compliance
- Appendix 4C, List of Permit and License Due Dates – Revision 009
Source: W:\DATA\EMS\EMS Manual\4. Compliance
- Appendix 4D, List of Information Sources – Revision 003
Source: W:\DATA\EMS\EMS Manual\4. Compliance
- Appendix 5A, Goals and Objectives – Revision 020
Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication\Goals and Objectives
- Appendix 6A, List of Interested Parties – Revision 013
Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication
- Appendix 9A, Record of Public Input and Inquiries (10/17/2019)



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Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication

- Appendix 3A, Critical Control Points – Revision 028
Source: W:\DATA\EMS\EMS Manual\6. Operational Control\Critical Control Points
- LGMS Contractor Requirements (03/12/2018)
Source: W:\DATA\EMS\EMS Manual\6. Operational Control\Contractor Control\Contractor LGMS Requirements
- Louisville Green Brochures – Updated April 2018
Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication\Public Communication\Louisville Green Brochure\2019
- <http://www.louisvillegreen.com/>
- Appendix 14A, Corrective Action Plan Spreadsheet – Revision 93
Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication\Corrective Actions
- Appendix 14B, Corrective Action Plan Form Operations Blank – Revision 003
Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication\Corrective Actions
- Corrective Action Plans from External Audit #9 (#CA96-#CA104)
Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication\Corrective Actions\Active Corrective Actions
- Louisville Green Program Performance Report for 2018
Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication\Program Performance Reports\2018
- LGMS Internal Audit Report #12 – Conducted December 2018
Source: W:\DATA\EMS Audit\2018 Audit
- LGMS Third-party Audit Report #9 – Conducted November 2019
Source: W:\DATA\EMS\EMS Manual\5. Improvement and Communication\Audits\3rd Party Audit\#9 – 3rd Party Audit – November 2019
- Management Review Scope 2018



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Source: W:\DATA\EMS\EMS Manual\2. Management Direction\Management Review Meetings\2019

- Management Review Minutes – March 04, 2019
Source: W:\DATA\EMS\EMS Manual\2. Management Direction\Management Review Meetings\2019
- Action Plan for 2018 Management Review – Revision 000
Source: W:\DATA\EMS\EMS Manual\2. Management Direction\Management Review Meetings\2019



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5C. AUDITOR QUALIFICATIONS

Jennifer Garland-Waters: Staff Auditor II
Certified Internal Controls Auditor
MSD Executive Offices
13 Years Internal Audit Experience

Kyle Sipes: Staff Auditor I
MSD Executive Offices
2 Years of Internal Audit Experience