

**NATIONAL BIOSOLIDS PARTNERSHIP  
EIGHTH INTERIM AUDIT REPORT**

**Louisville and Jefferson County  
Metropolitan Sewer District**

**Louisville Green Management System**

**Louisville, Kentucky**

**Audit conducted by**

**NSF-International Strategic Registrations**

**William R. Hancuff, Lead Auditor**

**References:**

**National Biosolids Partnership (NBP) *BMP Elements*  
NBP *Third Party Verification Auditor Guidance – November 2001*  
*(Latest Revision August 2011)*  
NBP *Code of Good Practice*  
*Louisville Green Management System Manual*  
*(2016 – Version 1, May 9, 2016)***

**Final Report – June 20, 2016**

## **INTRODUCTION**

The purpose of the Biosolids Management Program (BMP) interim audits are to verify through regular reviews the system's health and effectiveness between verification audits. The third party on-site interim audits provide independent reviews and support credibility between re-verification audits. The goal of the audit is to collect and evaluate objective evidence related to a portion of the BMP such that over the course of the four interim audits conducted between verification audits all 17 elements are addressed.

The goal of this audit is to determine whether the Louisville and Jefferson County Metropolitan Sewer District (MSD) Louisville Green Management System (LGMS) is functioning as intended, that practices and procedures are conducted as documented, and that the BMP as implemented conforms to the NBP's Code of Good Practice and the BMP requirements of the National Biosolids Partnership (NBP) program objectives.

## **RECOMMENDATION**

The results of the LGMS eighth interim audit and review of corrective action plans are positive, and it is the recommendation of the audit team that the Louisville and Jefferson County Metropolitan Sewer District LGMS maintain its Platinum Level Recognition Certification status.

## **AUDIT SCOPE**

The (NSF-ISR) conducted a third party interim audit of the MSD's LGMS from June 14 through June 16, 2016. The on-site audit team consisted of Dr. William R. Hancuff, Lead Auditor.

The primary objective of the annual interim audit was to ensure the environmental management system health by reviewing:

- Progress toward goals and objectives,
- Corrective and preventive action requests and responses.
- Actions taken to correct minor non-conformances,
- Management review process, and
- EMS outcomes (environmental performance, regulatory compliance, interested party relations, and quality practices)

The first four items identified above involved reviewing procedures, activities, processes and products that have general requirements found in the NBP standard elements 5, 14, 15, 16 and 17. The fifth item, BMP outcomes, had the potential of involving other NBP standard elements, namely: 1, 2, 4, 6, 9, 10 and 13.

In addition to evaluation of the system as outlined above, the present interim audit scope included the review and verification of the maintenance and implementation of the LGMS relative to standard elements 3, 10, and 13.

The physical biosolids facilities included in the audit and visited during the interim audit included the Morris Forman and Derek R. Guthrie Water Quality Treatment Center, the Louisville Green processing and transportation facilities, a product retailer (Security Seed 7 Chemical) and one Louisville Green/Top Choice farm application site (Crawford Farm) in the Elizabethtown area of Hardin County KY. The physical biosolids facilities at the Morris Forman plant included in the audit and visited during the audit included the following biosolids value chain process area critical control points: preliminary/primary treatment, pure oxygen secondary treatment, digestion, digested solids dewatering, and solids heat drying. Additionally all of the operations and critical control points at the Derek R. Guthrie Water Quality Treatment Center were visited.

The following individuals were interviewed or otherwise participated in meetings as part of the audit process:

Alex Novak	Treatment Facilities Director
Tony Marconi	Operation Support Services Director
Robert Bates	Operations Treatment Facilities Manager
Joseph Falleri	Operations Project Specialist
Robin Burch	Process Support Supervisor
John Kessel	Plant Supervisor, Derek R. Guthrie Water Quality Treatment Center
Sheryl Lauder	Strategic Communications Supervisor
Lisa Gaus	Pretreatment Manager (by phone)
Jennifer Waters	MSD Internal Auditor – staff auditor
Sandra Conner	MSD Internal Auditor – staff auditor I
John Baldrige	Maintenance Planner
John Slavey	Electrician
John Barkham	Process Technician III (Dewatering)
William Summers	Process Technician III (Dryers)
Scott Miller	Manager – Security Seed & Chemical (Top Choice retailer)
Bradley Mannis	Marketer for Mannco Inc. (Biosolids purchaser/contractor)
Bob Bickner	Supervisor, Kentucky Department of Environmental Protection, Division of Waste Management, Solid Waste

## **INTERIM AUDIT FINDINGS**

The interim audit included review of the latest versions of relevant LGMS manual element procedures and employed the most recent version of the NBP Third Party Verification Auditor Guidance dated August 2011. The interim audit found 3 positive observations, no major non-conformances, 4 minor non-conformances and 4 opportunities for improvement.

The NBP Third Party Verification Auditor Guidance indicates that when the auditor has identified minor nonconformances during the on-site audit, the organization must resolve the nonconformances and provide documentation to the auditor within 30 days of the audit. NBP acknowledges that biosolids organizations may not be able to fully correct some minor nonconformances within 30 days, in which case NBP requires that the audited organization develop an action plan with time frames. The lead auditor must approve this plan and schedule for correcting minor nonconformances. Corrective action plans were prepared and submitted to the lead auditor, and the approach and time frame for implementation were approved. Field verification of the closure of all minor findings will be finalized during the next scheduled interim audit.

The following is a review of the positive observations made during the interim audit. The minor non-conformances and opportunities for improvement follow, and are listed by item number, which correspond to the element minimum conformance requirements found in the NBP Third Party Verification Auditor Guidance. These findings are presented in the sequence of the NBP standard elements.

### **Positive Observations**

The MSD management and all plant personnel involved in the biosolids environmental management system development should be recognized for their outstanding achievements, and the exceptional features of their Louisville Green Management System. The following is a summary of those positive observations made during the audit.

Element 1 – The process support supervisor, Robin Burch, has developed an exemplary support documentation program for the Louisville Green Management System. Many of these documents should serve as a benchmark for other agencies to emulate.

While the following two positive commendations were observed two years ago, they still deserve recognition as outstanding tools.

Requirement 5.7 – MSD has provided a noteworthy tool associated with its Appendix 5B: Goals and Objectives Action Plan and Tracking Spreadsheet to track progress on action plan schedules, milestones, and responsibilities for achieving biosolids goals and objectives.

Requirement 14.6 – MSD has developed an exemplary tracking system to ensure that progress in completing the corrective actions and periodically updating the status to reflect completion using Appendix 14A – Corrective Action Tracking Spreadsheet.

Finally, the hard work and dedication of the Core BMP Team must be acknowledged. Maintaining BMP platinum level certification is obviously a team effort, but the hard work and dedication of Robin Burch and leadership of Robert Bates and direction of Joseph Falleri to ensure continuous improvement must be recognized. Additionally, the

support, encouragement and active participation of the Director of Operations, Alex Novak, in the BMP process have guaranteed the continued success of the program.

### **Minor Nonconformances**

Requirement 5.1 – Not all of the objectives met the SMART criteria for example:

- Objective 1 did not identify that the improvement of preliminary treatment was specifically for the Morris Forman Treatment Plant, and that the decrease of debris contributed to the digesters would be measured in tons per month of screenings and grit removed at the headworks compared with tons per month for a similar period or flow conditions.
- Objective 2 did not identify that the measurable target was “on no single day would the dissolved oxygen drop below 8.0 mg/l at the fourth stage of the oxygen batteries, without taking remedial measures that require supplemental oxygen.”
- Objective 3 did not specifically state that the capacity of the dewatering biosolids conveyance system would be increased by 6 dry tons per hour to provide a total capacity of 12 dry tons per hour.
- Objective 4 did not meet the measurability criteria and was reclassified as a corrective action for continual improvement.
- Objective 5 did not meet the measurability criteria and was reclassified as a corrective action for continual improvement.
- Objective 6 did not specifically identify the objective as beneficially using 100 percent (as measured in dry tons) of the total biosolids produced.
- Objective 7 did not specifically identify increasing the electrical energy supply for use at the plant by 3,000 kilowatts. (Note: the action plan required to accomplish this was determined to be the installation of a new generator.)
- Objective 8 did not meet the measurability criteria and was reclassified as a corrective action for continual improvement.

Requirement 8.1 – There is no method of objectively verifying and documenting the effectiveness of operational documents training (e.g. computer software based Learning Management System – LMS).

Requirement 10.1 – The Standard Operating Procedures (Operations Documents) for the Derek R. Guthrie Water Quality Treatment Center have not been prepared.

Element 14 – The LGMS has not fully implemented identification of operational upset/unusual occurrences at the operator level to allow preparation of corrective action plans (including root cause analyses) to be prepared for malfunctioning operations.

### **Opportunities for Improvement**

Requirement 6.1 – Consider developing a list of communication activities in which interested parties identified in Appendix 6A: List of Interested Parties, can participate.

Requirement 14.2 – LGMS prepared a corrective action plan to address the level of Molybdenum that exceeded the federal limit required to meet exceptional quality (EQ) biosolids during the summer of 2015. This level of Molybdenum prevented the beneficial use of Louisville Green biosolids product during this timeframe. The corrective action plan (CA-62) calls for the preparation of a Molybdenum brochure to be distributed to commercial operations to make them aware of the potential impact on the plant and the biosolids product, as well as the regulatory implications if it is not adequately controlled. MSD personnel also proposed as part of the corrective action to provide information seminars, or one-on-one discussions, be held with individual commercial customers to make them aware of what they can do to reduce the impact. The initial target deadline for the completion of the brochure was extended from March 4, 2016 to June 30, 2016. The high molybdenum levels are experienced in the spring (March) and late summer (August). The deadline for disseminating the information to reduce the spring impact were missed and there is concern that missing another deadline will result in exceeding federal limits for molybdenum again in August of this year. Implementing corrective action in a timely manner is of critical concern.

Element 16 – Consider having a member of the operation staff participate as a member of the internal audit team.

Requirement 16.3 – LGMS Element 16: Internal LGMS Audits references the responsibilities of a Certified Lead Internal Auditor in the internal audit process. Although well qualified the lead auditor who conducted the 2015 internal audit did not have the credentials of a “Certified Lead Internal Auditor”.

For the minor non-conformances, MSD personnel prepared Corrective Action Plans, and will implement corrective actions according to their BMP procedures to provide continual improvements to their biosolids program. All proposed corrective action work plans were reviewed by the auditor and found to be acceptable and final closure will be verified during the next external third party audit. As a further measure to demonstrate continuous improvement the opportunities for improvement will be addressed to the maximum extent possible.

## **METROPOLITAN SEWER DISTRICT COMMENTS**

The Interim Audit performed by Dr. Bill Hancuff continues to be a value added experience to the Louisville Green Biosolids Management System. In his audit approach, Dr. Hancuff continues to show there are continual improvement opportunities in what is considered a mature Management System. The nonconformance findings during the audit were fair and accurate. -- Robin Burch MSD Process Support Supervisor

## **OUTCOMES MATTER**

The Policy of the Louisville Green Management System of the Louisville and Jefferson County Metropolitan Sewer District (MSD) is simply summarized as “MSD

will produce Exceptional Quality (EQ) biosolids and promote beneficial use.” The “EQ” rating has generated a highly marketable biosolids product.

Unfortunately, MSD suffered a setback in the beneficial use of its biosolids product in 2014 and 2015. The distribution by the Louisville Green marketed dropped from 98.8 percent in 2012 and 100% in 2013 to 81% in 2014 and 87% in 2015. Contract challenges, marketing shortfalls, and inability to maintain EQ biosolids product resulted in the final product being sent to a landfill.

The level of Molybdenum seasonally increased to a level that precluded this EQ rating for a period of time. The MSD is aggressively pursuing a program to control this constituent to eliminate the need to landfill final product instead of beneficially using it.

The LGMS completely reevaluated its goals and objectives in 2013 and revamped their program through establishing one main goal with supporting objectives to attain that goal. The goal is to “continually enhance the biosolids process to improve communication, efficiency, quality and sustainability through 2018.”

Initially there were eight objectives focused on supporting and achieving this goal. Several of these objectives have been carried over through 2014 and 2015 with those that have been accomplished retired. The objectives were developed by the LGMS Core Team considering public input and, to a degree, using Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) criteria. Each of the objectives were reviewed to determine their relevance to one or more of the four NBP required outcome areas below:

1. Environmental Performance,
2. Regulatory Compliance,
3. Relations with Interested Parties, and
4. Quality Biosolids Management Practices.

While it is not a requirement to fully attain all objectives, it is a critical component of the system to make progress towards accomplishing the overall goal. It should also be recalled that attainment of objectives is not the only measure of continual improvement, but corrective actions play a vital role in that measure.

The facility’s performance relative to each of the above listed outcome is identified parenthetically as a “relevant” criterion with each of the objectives addressed below.

Objective 1: Implement an improved Preliminary Treatment System at the Morris Forman wastewater facility by December 31, 2016 to reduce the amount of debris sent to the anaerobic digesters by 10%.

The facility’s digesters accumulate inert and inorganic materials sufficient to reduce the effectiveness of the digestion process and require the digesters to be frequently cleaned at a substantial cost. Improving the preliminary treatment through installing new bar screens with reduced openings will remove considerably more materials than has historically been collected thus eliminating a portion of the inert materials that otherwise

would pass through into the digesters and have deleterious effects on pumps and other processes downstream. Additionally redesigning the headworks grit removal system will have a measurable impact on the amount of inorganic material prevented from entering the digesters and reducing their effective treatment volume.

The amount of debris removed through the preliminary treatment processes has been historically measured by the amount of material collected in the waste lugs measured in number of loads and wet tons. The increase in the amount solids and grit removed through the new preliminary processes is estimated to be approximately 50%; and the reduction of material accumulated in the digester that will need to be removed is anticipated to be roughly 20%. The latter will be determined during the regularly scheduled routine cleaning of digesters.

Grit removed in the grit chambers and solids cleaned from the bar screens are combined into one luger, but the quantities of each can be estimated. Currently data on the total tons of combined grit and screenings are gathered on a daily basis and summarized monthly. An effort has been made to estimate the total tons of screening solids removed from the bar screens so that a removal baseline can be established for both the screens and grit chambers for future comparison.

The construction contract for the new headworks was initiated in the middle of 2015. Progress on construction is on schedule and completion is scheduled for the end of 2016. After installation and commencement of operations exact quantities of both screenings and grit will be able to be measured.

Outcome Areas: Environmental Performance and Quality Biosolids Management Practices.

Objective 2: At the Morris Foreman Plant on no single day will the dissolved oxygen drop below 8.0 mg/l at the fourth stage of the oxygen batteries; which will be accomplished without taking remedial measures that require supplemental oxygen.

Since the installation of the pure oxygen treatment system many years ago its reliability has diminished. The health of the secondary process, biosolids settleability and downstream processing is dependent upon the oxygen fed and the resulting dissolved oxygen in the process. Failure to feed the required amount of oxygen results in biological upset, which has a direct correlation to the quality of solids removed and the waste activated solids (WAS) used to produce the Louisville Green final product.

The initial action plan is to implement operational controls at optimal level to minimize the occurrences of low dissolved oxygen concentrations. The ultimate action plan is to replace the failing High Purity Oxygen Generation System. The implementation of the latter action has been delayed for a couple of years and is now scheduled for March 2017.

The replacement of the oxygen generation system will increase the reliability of the process and minimize potential adverse consequences associated with failure, including compliance with regulatory requirements, i.e. dissolved oxygen level not less than 2.0 ppm.

The fourth stage dissolved oxygen and the return activated solids volatile settleable solids are monitored on a daily basis. The dissolved oxygen of 10 ppm in the fourth stage has historically proven to be a desirable target. Concern develops if this value drops to below 8 ppm. The new system will assure the capability of maintaining 10 ppm 100% of the time, if desired.

Outcome Areas: Environmental Performance, Quality Biosolids Management Practices and Regulatory Compliance.

Objective 3: At the Morris Forman Regional Plant increase the dewatered biosolids conveyance system capacity by 6 tons per hour to provide a total capability of conveying 12 tons per hour by December 31, 2016.

There are currently three sets of conveyors to transport biosolids cake to the truck loadout and cake hopper. The conveyors are old and have not had any major rebuilding. They are in need of repair to maintain reliable functioning in the future. If the conveyors fail the cake would not be able to be sent to the landfill, if the dryer trains fail, and the latter are reaching the end of their useful life without major rehabilitation.

As of June 10, 2016 equipment has been installed and the operations are awaiting vendor availability for startup. Operation is scheduled to commence November 30, 2016.

Outcome Areas: Environmental Performance and Quality Biosolids Management Practices

Objective 4: Update the Louisville Green Websites “Home” and “About Us” to provide additional biosolids information to the general public and interested parties.

It was determined that the measurability of this objective would be challenging. It was therefore decided to reclassify this continual improvement as a corrective action.

Outcome Areas: Relations with Interested Parties

Objective 5: Administer a training needs assessment and report for operations division by June 30, 2016.

It was determined that the measurability of this objective would be challenging. It was therefore decided to reclassify this continual improvement as a corrective action.

Outcome Areas: Environmental Performance, Regulatory Compliance, and Quality Biosolids Management Practices.

Objective 6: Meet KPDES permit requirements for all MSD's WQTC's from July 1, 2015 to June 30, 2016. (Note: This is the Treatment Facilities Director's objective for all MSD facilities.)

Operations personnel recognize that this objective has a multitude of targets within it, many of which are not specifically or directly related to the biosolids product or the value chain. It was therefore determined that as part of the director's objective a specific biosolids target would be established. This latter objective is to ensure that no biosolids will be taken to a landfill because it did not meet the regulatory requirements for Class A exceptional quality (EQ) biosolids. (Note: In the recent past some biosolids had to be taken to the landfill because they exceeded the metal concentration limits established for EQ biosolids). The ultimate target is to beneficially use 100 percent (as measured in dry tons) of the total biosolids produced, consistent with the MSD biosolids policy.

To accomplish this objective an aggressive public education program has been established to alert those commercial operations that use molybdenum in their cooling water treatment chemicals of their impact on the treatment plant and the ultimate beneficial use of biosolids.

Outcome Areas: Environmental Performance, Regulatory Compliance, Relations with Interested Parties, and Quality Biosolids Management Practices.

Objective 7: To increase the resident electrical capacity of the Morris Forman Plant by 3,000 KW by December 31, 2016.

The action plan to accomplish this objective will involve the installation of an emergency generator with 3,000 KW capacity at the final effluent pump station. The primary function of this increase will be to ensure reliability of plant pumping station during emergencies such as power outages and flooding. This additional capacity will provide pumping capacity of 100 million gallons per day in the event of a plant power failure when the effluent gate is closed.

The generator delivery date is scheduled for June 25, 2016.

Outcome Areas: Environmental Performance, Regulatory Compliance, Relations with Interested Parties, and Quality Biosolids Management Practices.

Objective 8: To install a new plant power distribution yard to provide for 100% power redundancy by December 31, 2016.

It was determined that the primary driver for this objective was associated with failure of the electrical high yard and resulting flooding of the plant. It was therefore decided to reclassify this continual improvement as a corrective action. The action plan will be to redesign the existing high yard configuration along with relocating the distribution power lines.

As of June 2016 construction has commenced; clearing has been completed, excavation is complete, retaining walls are being constructed and equipment has been ordered.

Outcome Areas: Environmental Performance, Regulatory Compliance, Relations with Interested Parties, and Quality Biosolids Management Practices.

## **CONCLUSIONS AND RECOMMENDATIONS**

The results of the third party interim audit show the Louisville and Jefferson County Metropolitan Sewer District has a strong mature Environmental Management System. The NSF lead auditor reviewed and approved the corrective action plans for the minor nonconformances associated with the interim audit. Therefore, it is the recommendation of the audit team that the Louisville Green Environmental Management System of Louisville, Kentucky retain its platinum level recognition certification status.

As was mentioned previously, a BMP is a continuously improving process, and retention of certification status is not the end. The results of this and future audits will provide value added to the system and should be viewed as an overall opportunity to improve. Every audit is a snapshot in time, and does not, or cannot, identify each and every area for improvement. And yet, while no single audit identifies all of the areas for improvement the results of each audit provide an additional incremental step in the overall system's improvement.

The scope of each interim audit must include a review of the organization's progress toward goals and objectives; BMP outcomes (environmental performance, regulatory compliance, interested party relations, and quality practices); actions taken to correct minor nonconformances; the management review process; and corrective and preventive action requests and responses. This review generally includes requirements found in elements 1, 2, 5, 6, 9, 14, 15, 16 and 17.

In order to address each element of the NBP standard over the four years of interim audits the following elements are scheduled over the period between verification audits:

Year 6 (third party) – Elements 2, 5, 6, and 9 (completed)

Year 7 (internal) – Elements 1, 4, and 8 (completed)

Year 8 (third party) – Elements 3, 10, and 13 (completed)

Year 9 (internal) – Elements 7, 11, and 12

Year 10 (third party) – Re-Verification audit

## **Attachment 1**

### **Documents and Other Objective Evidence Reviewed During the Interim Audit**

#### Element 1. BMP Manual

- Louisville Green Management System (LGMS) Manual, 2016 Version 1 – May 9, 2016.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist, and Robin Burch, Process Support Supervisor.

#### Element 2. Biosolids Management Policy

- LGMS Manual – Element 2 – Biosolids Management Policy, Rev 019, May 9, 2016.
- LGMS Manual – Appendix A: National Biosolids Partnership’s Code of Good Practice.
- Interviews with Alex Novak, Treatment Facilities Director and Tony Marconi, Operation Support Services Director.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist, and Robin Burch, Process Support Supervisor.

#### Element 3. Critical Control Points

- LGMS Manual – Element 3 – Critical Control Points, Rev 017 – May 27, 2014.
- LGMS Manual – Appendix 3A – List of Critical Control Points and Operational Controls, Rev 25 – Nov 16, 2015.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist, and Robin Burch, Process Support Supervisor.

#### Element 4. Legal and Other Requirements

- LGMS Manual – Element 4 – Legal and Other Requirements, Rev 017 – May 27, 2014.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist, and Robin Burch, Process Support Supervisor.
- Interview with Lisa Gaus, pretreatment program manager.
- Interview with regulator – Bob Bickner, Supervisor, Kentucky Department of Environmental Protection, Division of Waste Management, Solid Waste.

## Element 5. Goals and Objectives

- LGMS Manual – Element 5 – Goals and Objectives, Rev 019, Dec 25, 2014.
- Appendix 5A: Goals and Objectives for 2014, Rev 012 – June 25, 2014.
- Appendix 5A: Goals and Objectives for 2015, Rev 014 – Dec 15, 2014.
- Appendix 5A: Goals and Objectives for 2016, Rev 015 – Nov 30, 2015.
- Appendix 5B: Goals and Objectives Action Plan and Tracking Spreadsheet for 2015 Objectives 1, 2, 3, 4, 6, 7, and 8.
- Review of grit and screenings data sheets for 2015 associated with Objective 1.
- Appendix 6A: List of Interested Parties, Rev 011 – May 4, 2016.
- Interview with Alex Novak, Treatment Facilities Director and Tony Marconi, Operation Support Services Director.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist; and Robin Burch, Process Support Supervisor.
- Louisville Green Program Performance Report for 2014, Rev 002 – April 12, 2016.
- Louisville Green Program Performance Report for 2015, Rev 001 – April 12, 2016.

## Element 6. Public Participation in Planning

- LGMS Manual – Element 6 – Public Participation in Planning, Rev 018 – June 25, 2014.
- Table 6.1 – Identification of Formal and Informal Participation Mechanisms.
- Appendix 6A: List of Interested Parties, Rev 011 – May 4, 2016.
- Louisville Green Management System: Contractor Requirements, Rev 004 – Jan 22, 2015.
- LGMS Manual – Element 9 – Communication, Rev 018 – Dec 16, 2014.
- Overview of Meetings Held in 2015 and 2016 regarding Top Choice application and benefits.
- Interviews with Alex Novak, Treatment Facilities Director and Tony Marconi, Operation Support Services Director.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist, Robin Burch, Process Support Supervisor and Sheryl Lauder, Strategic Communications Supervisor.
- Interviews with Scott Miller, Manager – Security Seed & Chemical (Top Choice retailer) and Bradley Mannis, Marketer for Mannco Inc. (Biosolids purchaser/contractor).
- Interview with Bob Bickner, Supervisor, Kentucky Department of Environmental Protection, Division of Waste Management, Solid Waste.
- Evaluating the Future of Biosolids Drying: Louisville MSD’s Decision – a presentation prepared by Robert Bates March 3, 2015.
- MSD – Louisville Green Management System website ([http://www.msdlouky.org/programs/envir\\_man\\_sys.htm](http://www.msdlouky.org/programs/envir_man_sys.htm)).

- Multi-color single sheet presentation of MSD Policy and Code of Good Practice.
- Multi-color single sheet “Top Choice” – An Exceptional Quality Granular Organic Biosolids Fertilizer.
- Top Choice Organic Biosolids – Material Safety Data Sheet.
- Multi-color flyer “Top Choice Organic Soil Amendment” by Security Seed.
- Louisville Green Program Performance Report for 2014, Rev 002 – April 12, 2016.
- Louisville Green Program Performance Report for 2015, Rev 001 – April 12, 2016.

#### Element 7. Roles and Responsibilities

- Not specifically reviewed.

#### Element 8. Training

- LGMS Manual – Element 8 – Training, Rev 017 – May 27, 2014.
- LGMS Manual – Appendix E: Employee Training Program Guidelines, Rev 019 – May 9, 2016.
- Review of various Employee Training Records: Employee Training Log for 2014 and 2015.
- 2014 Awareness Training Power Point Slide Deck updated in 2015 Training Document.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist, and Robin Burch, Process Support Supervisor.
- Interviews with operations and maintenance personnel: John Kessel, Plant Supervisor, Derek R. Guthrie Water Quality Treatment Center; John Barkham, Process Technician III (Dewatering); William Summers, Process Technician III (Dryers), John Baldrige, Maintenance Planner, and John Slavey, Electrician.
- Interview with contractor: Bradley Mannis, Marketer for Mannco Inc. (Biosolids purchaser/contractor).
- Interview with product distributors and users - Scott Miller, Manager – Security Seed & Chemical (Top Choice retailer).

#### Element 9. Communications

- LGMS Manual – Element 9 – Communication, Rev 018 – Dec 16, 2014.
- LGMS Manual – Element 6 – Public Participation in Planning, Rev 018 – June 25, 2014.
- Table 6.1 – Identification of Formal and Informal Participation Mechanisms.
- Appendix 6A: List of Interested Parties, Rev 011 – May 4, 2016.
- Louisville Green Management System: Contractor Requirements, Rev 004 – Jan 22, 2015.
- Overview of Meetings Held in 2015 and 2016 regarding Top Choice application and benefits.

- Interviews with Alex Novak, Treatment Facilities Director and Tony Marconi, Operation Support Services Director.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist, Robin Burch, Process Support Supervisor and Sheryl Lauder, Strategic Communications Supervisor.
- Interviews with Scott Miller, Manager – Security Seed & Chemical (Top Choice retailer) and Bradley Mannis, Marketer for Mannco Inc. (Biosolids purchaser/contractor).
- Interview with Bob Bickner, Supervisor, Kentucky Department of Environmental Protection, Division of Waste Management, Solid Waste.
- Evaluating the Future of Biosolids Drying: Louisville MSD’s Decision – a presentation prepared by Robert Bates March 3, 2015.
- MSD – Louisville Green Management System website ([http://www.msdlouky.org/programs/envir\\_man\\_sys.htm](http://www.msdlouky.org/programs/envir_man_sys.htm)).
- Multi-color single sheet presentation of MSD Policy and Code of Good Practice.
- Multi-color single sheet “Top Choice” – An Exceptional Quality Granular Organic Biosolids Fertilizer.
- Top Choice Organic Biosolids – Material Safety Data Sheet.
- Multi-color flyer “Top Choice Organic Soil Amendment” by Security Seed.
- Louisville Green Program Performance Report for 2014, Rev 002 – April 12, 2016.
- Louisville Green Program Performance Report for 2015, Rev 001 – April 12, 2016.

#### Element 10. Operational Control of Critical Control Points

- LGMS Manual – Element 10 – Operational Controls, Rev 018 – Dec 15, 2014.
- LGMS Manual – Element 3 – Critical Control Points, Rev 017 – May 27, 2014.
- LGMS Manual – Appendix 3A – List of Critical Control Points and Operational Controls, Rev 25 – Nov 16, 2015.
- Standard Operating Procedure Manual for Dryers.
- Memo addressing Emergency Solids Disposal at Floyds Fork and Derek R. Guthrie Water Quality Treatment Centers dated May 23, 2014.
- Review of the water quality discharge monitoring results from the Derek R. Guthrie Water Quality Treatment Center for May 2016.
- Site visit to farm application site (Crawford Farm) in the Elizabethtown area of Hardin County KY.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist, and Robin Burch, Process Support Supervisor.
- Interviews with operations and maintenance personnel: John Kessel, Plant Supervisor, Derek R. Guthrie Water Quality Treatment Center; John Barkham, Process Technician III (Dewatering); William Summers, Process Technician III (Dryers), John Baldrige, Maintenance Planner, and John Slavey, Electrician.
- Interview with contractors: Bradley Mannis, Marketer for Mannco Inc. (Biosolids purchaser/contractor).

- Interviews with product distributor - Scott Miller, Manager – Security Seed & Chemical (Top Choice retailer).

#### Element 11. Emergency Preparedness and Response

- Not specifically reviewed.

#### Element 12. BMP Documentation and Document Control

- Not specifically reviewed.

#### Element 13. Monitoring and Measurement

- LGMS Manual – Element 13 – Monitoring and Measurement, Rev 017 – May 27, 2014.
- LGMS Manual – Element 3 – Critical Control Points, Rev 017 – May 27, 2014.
- LGMS Manual – Appendix 3A – List of Critical Control Points and Operational Controls, Rev 25 – Nov 16, 2015.
- Standard Operating Procedure for Dryers.
- Site visit to farm application site (Crawford Farm) in the Elizabethtown area of Hardin County KY.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist and Robin Burch, Process Support Supervisor.
- Interviews with operations and maintenance personnel: John Kessel, Plant Supervisor, Derek R. Guthrie Water Quality Treatment Center; John Barkham, Process Technician III (Dewatering); William Summers, Process Technician III (Dryers), John Baldrige, Maintenance Planner, and John Slavey, Electrician.
- Interviews with contractors: Bradley Mannis, Marketer for Mannco Inc. (Biosolids purchaser/contractor)
- Interview with product distributor - Scott Miller, Manager – Security Seed & Chemical (Top Choice retailer).

#### Element 14. Nonconformances: Preventive and Corrective Action

- LGMS Manual – Element 14 – Nonconformances - Preventive and Corrective Action, Rev 017 – May 27, 2014.
- National Biosolids Partnership Louisville Green Management System Internal Audit Report #9 dated January 22, 2015 for audit conducted December 11-12, 2014.
- National Biosolids Partnership Louisville Green Management System Internal Audit Report #10 dated January 25, 2016 for audit conducted November 30, 2015.
- Appendix 14B - Corrective Action Plan Form, Rev 002 – June 24, 2013.
- Review of each Appendix 14B Action Plan and Tracking forms for all minor nonconformities identified during the third party external interim audit.

- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist; Robin Burch, Process Support Supervisor; Jennifer Waters, MSD Internal Auditor – staff auditor, and Sandra Conner, MSD Internal Auditor – staff auditor I.

#### Element 15. Biosolids Management Program Report

- LGMS Manual – Element 15 – Biosolids Management Report, Rev 017 – May 27, 2014.
- Interview with Alex Novak, Treatment Facilities Director.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist and Robin Burch, Process Support Supervisor.
- Louisville Green Program Performance Report for 2014, Rev 002 – April 12, 2016.
- Louisville Green Program Performance Report for 2015, Rev 001 – April 12, 2016.

#### Element 16. Internal BMP Audit

- LGMS Manual – Element 16 – Internal Audits, Rev 018 – Dec 15, 2014.
- Appendix 14B - Corrective Action Plan Form, Rev 002 – June 24, 2013.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist; Robin Burch, Process Support Supervisor; Jennifer Waters, MSD Internal Auditor – staff auditor, and Sandra Conner, MSD Internal Auditor – staff auditor I.
- Louisville Green Management System Internal Audit #9 – December 2014 – Audit Scope
- National Biosolids Partnership Louisville Green Management System Internal Audit Report #9 dated January 22, 2015 for audit conducted December 11-12, 2014.
- Louisville Green Management System Internal Audit #10 – December 2015 – Audit Scope
- National Biosolids Partnership Louisville Green Management System Internal Audit Report #10 dated January 25, 2016 for audit conducted November 30, 2015.
- Reviewed various samples of Appendix 14B Action Plan and Tracking forms for nonconformities and opportunities for improvement identified during the internal and interim audits of 2014 and 2015.

#### Element 17. Management Review

- LGMS Manual – Element 17 – Management Review, Rev 017 – May 27, 2014.
- Reviewed Louisville Green Management Review Scope (agenda) held March 14, 2015 for calendar year 2014.
- Reviewed Minutes of Management Review Team Meeting held March 14, 2015

- Reviewed Action Plan for 2015 Management Review, Revision dated 4-12-16.
- Reviewed Louisville Green Management Review Scope (agenda) held April 11, 2016 for calendar year 2015.
- Reviewed Minutes of Management Review Team Meeting held April 11, 2016.
- Reviewed Action Items Resulting from 2015 Management Review.
- Interviews with Alex Novak, Treatment Facilities Director and Tony Marconi, Operation Support Services Director.
- Interviews with Robert Bates, Operations Treatment Facilities Manager; Joseph Falleri, Operations Project Specialist and Robin Burch, Process Support Supervisor.