National Biosolids Partnership

Biosolids EMS Verification Audit Report

Louisville and Jefferson County Metropolitan Sewer District
Louisville, Kentucky

Report Date: July 31, 2008

Audit Conducted and Reported By

KEMA-Registered Quality, Inc., Chalfont PA
Auditors: Mr. Jon Shaver - Biosolids EMS Lead Auditor, Jeanette Klamm – Biosolids Auditor

Audit Dates

Documentation Review – April 11, 2008
Onsite audits – May 12 – 15, 2008 + July 8, 2008

Review and Approval

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1. SUMMARY

KEMA-Registered Quality Inc. (KEMA) conducted an audit of the biosolids management system of Louisville and Jefferson County Metropolitan Sewer District (MSD) in Louisville Kentucky on behalf of the National Biosolids Partnership (NBP) and as requested by MSD . The scope of this audit covered the entire biosolids value chain, as practiced by MSD, including Pretreatment and Collection, Wastewater Treatment and Solids Generation, Biosolids Stabilization, Conditioning and Handling, Solids Storage and Transportation and Biosolids Use / Disposition. The audit included a review of EMS Documentation (completed April 11, 2008), onsite analysis of biosolids management processes and practices (conducted May 12 to 15, 2008) and a Corrective Action (follow-up) Audit to review correction of major nonconformances (conducted July 8 and July 29, 2008).

The primary purpose of the audit was to verify that the system being used by MSD in managing its biosolids activities meets the expectations and requirements of the National Biosolids Partnership's Biosolids EMS Program, particularly the 17 EMS Elements (audit criteria). The audit was also intended to verify that the MSD biosolids management system is functioning effectively.

During the course of this audit 8 nonconformances were identified with respect to the requirements of the NBP's EMS Elements. As part of this Verification Audit, KEMA determined that 3 major nonconformances found during the initial onsite audit were effectively corrected. Five minor nonconformances remain open and KEMA's Lead Auditor has reviewed MSD's corrective action plans for those nonconformances and found them to be acceptable.

As a result of this audit, KEMA has verified that the biosolids management system being used by MSD meets the expectations and requirements of the NBP EMS Elements. Certification of the Louisville and Jefferson County Metropolitan Sewer District biosolids management system within the NBP Biosolids EMS Program is recommended.

2. BACKGROUND

2A. Agency Details

Agency Name: Louisville and Jefferson County Metropolitan Sewer District (referred to as MSD in this report)

Facility: Morris Forman Wastewater Treatment Plant, Louisville KY

Volume of Wastewater Treated = 120 MGD (average), permitted to 300MGD

Biosolids Produced = 80 dry tons per day Class A EQ

Number of Employees = 120

2B. Audit Purpose and Criteria

The purposes of this audit were to verify that the management system being used by MSD in managing its biosolids activities:

- Conforms to expectations and requirements of the National Biosolids Partnership (NBP) Environmental Management System for Biosolids standard, comprised of 17 EMS Elements
- Is functioning as intended, that is practices and procedures are being performed as documented
- Is producing desired results (outcomes)

The criteria for this audit were the requirements specified in the National Biosolids Partnership EMS Elements (May 2002).

2C. Audit Scope

This Verification Audit covered the entire biosolids value chain as practiced by MSD, including pretreatment and collection, wastewater treatment and solids generation, biosolids stabilization conditioning and handling, solids storage and transportation and biosolids use / disposition. Special attention was given to practices and management activities that directly support biosolids-related operations, processes and activities.

Audit activities included:
- Review of MSD Biosolids EMS Documentation (EMS Manual).
- EMS processes used by MSD in managing it's biosolids activities, covering all requirements of the 17 EMS Elements.
- Testing of pertinent transactions to assess the health and functionality of the management system.
- Interviews with interested parties, including regulators, neighbors and environmental advocates.
- Examination of outcomes MSD is achieving through the use of their EMS.
- Follow-up review of corrective action completed in a timely manner by MSD for major nonconformances identified during the audit.

<u>Biosolids Production Sites Audited</u>

Morris Forman Wastewater Treatment Plant

Biosolids Use / Disposition Sites Audited

Gary Farm, Hardin County – agriculture application of Louisville Green
Hardesty Farms, Meade County – agriculture application of Louisville Green

Contractors Interviewed

A-J Inc. (Sales Agent)
Waste Management Inc.

2D. Audit Phases and Timing

The complete audit included three "phases, as described below. This report is a combined report for all phases of this audit.

Phase 1 – KEMA's Lead Auditor reviewed MSD's Management System Documentation (referred to as the MSD EMS Manual). The results of that review (see Appendices to this report) were reported to MSD on April 11, 2008.

Phase 2 – KEMA performed an onsite audit of MSD's full biosolids management system, including processes used at the Morris Forman plant, offsite biosolids use locations and related contractor control processes. This part of the audit was conducted May 12-15, 2008.

Phase 3 – KEMA conducted an onsite review of corrective action taken by MSD in response to 3 major nonconformances found during phase 2. This part of the full Verification Audit was conducted on July 8, 2008 with additional follow-up on or about July 28, 2008.

2E. Audit Methodology

KEMA's standard management system auditing practices were used. The KEMA "process auditing" approach assesses each system process being used by MSD in managing its biosolids activities for conformance with all applicable requirements of the NBP EMS Elements. Audits were performed by interviewing key personnel involved in each process, observing practices in place and reviewing pertinent documentation.

2F. Auditors

The National Biosolids Partnership contracted KEMA-Registered Quality Inc. to perform this audit on their behalf. KEMA's Audit Team consisted of:

Jon Shaver – Biosolids EMS Lead Auditor
Jeanette Klamm – Biosolids Auditor

The above auditors are qualified to perform this audit through certification by the National Biosolids Partnership. KEMA asserts that the relationship that our firm and auditor has with Louisville and Jefferson County Metropolitan Sewer District is independent and meets criteria established by the National Biosolids Partnership for Third Party Audit Companies and Third Party Auditors.

2G. Definitions and References

Definition of Terms

Major Nonconformance – an omission from requirements and/or other departure that represents, or could cause, a systemic failure and/or a departure from the Biosolids Policy.

Minor Nonconformance – an isolated departure from requirements that does not represent a systemic failure.

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

Corrective Action Plan – a plan developed by the agency being audited to correct a nonconformance and/or prevent that nonconformance from re-occurring.

References

The following documents were used as references during this audit:

MSD EMS Manual (as provided to KEMA in March 2008)
National Biosolids Partnership "EMS for Biosolids" standard (May 2002)
National Biosolids Partnership Biosolids EMS Auditor Guidance (August 2007)
National Biosolids Partnership Code of Good Practice
National Biosolids Partnership Manual of Good Practice

3. SUMMARY OF AUDIT RESULTS

The following summarizes results of this audit. Detailed results for each process audited are described in Section 4 of this report.

3A Strengths Observed

During this audit, the Audit Team observed the following strengths in MSD's biosolids management system:

- Senior management at MSD is very involved in operations and developing public acceptance and beneficial reuse for the agency's biosolids.
- Customer acceptance of Louisville Green quality is a high priority throughout the MF plant.
- Thorough training of employees is leading to a high level of awareness of their responsibilities & role in producing an acceptable biosolids product.

3B Outcomes

MSD reported the following outcomes from the use of an environmental management system approach to managing their biosolids program in the past 3 years: KEMA examined these outcomes and agree that they represent gains achieved by the use of the MSD biosolids EMS.

<u>Regulatory Compliance</u>

- Attention to controls placed on the biosolids operation has contributed effectively to the liquid side of the Morris Forman plant operating without compliance violation since October 2006.

<u>Environmental Performance</u>

- Product characteristics have improved considerably in the past 2 years (less odor, more consistent density & size, less dust) in response to input from users, resulting in a continuing high demand for the Louisville Green product and this beneficial use of biosolids. Beneficial use has increased from about 50% of MSD biosolids in 2005 to approximately 84% in 2007.
- Beneficial reuse of biosolids is saving MSD over $500K/year by avoiding use of landfill.

<u>Biosolids Quality Practices</u>

- Replacement of the Zimpro process resulted in reduced odor, fewer complaints, less waste to landfill. $2MM direct cost reduction.
- Management direction for improving equipment reliability, personnel skills and standardizing procedures have contributed to increasing beneficial reuse from 84% in 2007 to 90% in 2008
- Customer education and complaint handling has reduced complaints significantly in recent years. $600+K/yr direct chemical cost reduction.

<u>Interested Party Relations</u>

- MSD's public outreach has helped in developing trust in MSD, enabling an increase in demand for biosolids and acceptance for a rate increase in 2007.

3C Nonconformances Remaining Open

At the conclusion of this audit the following nonconformances found by KEMA with respect to the expectations and requirements of the NBP Biosolids EMS Elements remained open. MSD prepared corrective action plans for each nonconformance and KEMA's Lead Auditor reviewed and approved those plans for implementation. Effective correction of each nonconformance remaining open will be verified during the next Third Party Audit.

Minor Nonconformance 08-01/Element 1 EMS documentation is not consistent with NBP requirements in some areas:

- Each Element has been approved by an individual, however the authority of that individual is not clearly described or referenced.
- The "fenceline" included in documentation infers the EMS does not extend to external biosolids transportation and use. Exclusion of "biosolids use / disposal" is not consistent with MSD EMS Element 1 and with NBP requirements.

Minor Nonconformance 08-02/Element 2 It is not clear how performance against policy commitments is monitored or assessed to ensure these commitments are integrated into MSD activities.

Minor Nonconformance 08-03/Element 3 The description of critical control points in MSD EMS Manual (El 3 - scope) does not include the need to meet public acceptance requirements,.

Minor Nonconformance 08-07/Element 17
Management reviews do not specifically address suitability and adequacy of the EMS.

Minor Nonconformance 08-08/Element 12 As currently structured, the EMS Manual and SOPs accessed online can be changed without authority, meaning the documents in use may not be fully controlled by the proper authority.

KEMA found additional nonconformances found during the initial Verification Audit. MSD took action to correct those nonconformances and KEMA conducted a Corrective Action (follow-up) Audit within 90 days of the onsite audit to review the effectiveness of those actions. The results of that Corrective Action Audit are described in Section 4 of this report.

3D Opportunities

The following "opportunities" for improving the MSD Biosolids Management Program were identified during the audit. They are based on the Auditors experience only and there is no requirement for action by MSD in response to these observations.

1. Responsibilities for the "Core Team" and "LG Team" could be defined to ensure members clearly understand the purposes of each team.
2. The need for operational controls (EMS Manual, Appx 3A) could identify any legal and other requirements, public acceptance requirements and potential environmental impacts to ensure the controls address these considerations.
3. A connection between MSD "Vision", "Mission", Core Values" and the Biosolids Policy and Goals could help integrate these principles into the MSD biosolids program

4. Some identified “environmental impacts” related to critical control points could be more explicit in terms of actual impacts, rather than the effect on the treatment system.
5. Review of critical control points on a quarterly schedule seems unnecessarily frequent. Incorporating reviews as part of the Management of Change procedure could be just as effective.
6. The definition of “interested parties” could better describe all parties that MSD considers as stakeholders.
7. The Rubbertown Community Advisory Councilcould be useful in establishing proactive communications with the public about biosolids and the MSD biosolids program.
8. Use of the term “organic” in promoting Louisville Green could be reviewed in consideration of US Dept of Agriculture Organic Food Production requirements.
9. Documented procedures for receiving chemicals could be helpful in ensuring chemicals are handled safely and reduce the risk of incidents.
10. More inspection of incoming vehicles intended for transporting biosolids could improve safety, emergency preparedness and security for that transportation.
11. Uncompleted preventive maintenance tasks ranging from 30% - 60% monthly in some areas could be addressed through the EMS CAPA process.
12. Internal audits could be reduced in scope and increased in frequency to address specific program requirements and/or conditions.
13. Corrective Action could be established as a process that includes several different ways to correct problems and escalated “top corrective actions” with cause of cause analysis to determine preventive action.
14. Records identified as requiring control in the MSD biosolids EMS could include reports that are issued to external regulatory agencies, incidents investigations.

3E Transaction Tests

The following transactions were tested to confirm that the EMS responded dynamically and effectively to them.

- EPA recommendations for “Fats Oils & Grease” program are being implemented by the Pretreatment Dept, including communication to dischargers and training of inspectors (haulers) and procedures for notifying persons in violation. This program has not yet adopted critical control points or operational controls consistent with the MSD biosolids EMS.
- Changes in the Document Control and Recordkeeping Procedure, including documents and records requiring control, were reviewed by personnel affected and planned using the management of change procedure.
- Improvements in operations leading to better quality product (e.g. 94% minimum dryness in pellets) were taken in response to stakeholder requests and understanding of technology for minimizing fire potential.

In each of the above situations, the MSD biosolids program was found to have satisfactorily responded to changes by adapting operational controls and responsibilities

3F Verification Conclusion

Based on the results of our audit, KEMA issues the following verification statement for the EMS being used by Louisville and Jefferson County Metropolitan Sewer District in managing its biosolids activities:

"The Louisville and Jefferson County Metropolitan Sewer District has been independently verified by KEMA-Registered Quality 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 the requirements of the National Biosolids Partnership."

3G Appeals

The NBP provides an appeals process for biosolids organizations and interested parties that disagree with the findings of a third party EMS audit. The verification appeals process involves an Appeals Board; representing a balance of biosolids management interested parties, including an environmental advocacy group, and wastewater industry professionals. An appeal must be submitted within 30 days of the official verification decision or interim audit decision by the Audit Company. Anyone who may need help in understanding the appeals process should contact the National Biosolids Partnership staff, Mr. Eugene DeMichele at 703-684-2438, or send an e-mail to: edemichele@wef.org.

In addition, MSD may, if it chooses, appeal the manner in which this audit was conducted and/or any findings directly to KEMA by contacting KEMA's headquarters at 4377 County Line Road, Chalfont PA. KEMA will review any such appeal to verify that the audit and/or any findings are consistent with acceptable management system auditing practices.

3H Requests / Agreements

NBP requires that interim audits of an agency's Biosolids EMS be conducted annually to verify the system's continuing conformance and effectiveness. Interim Audit #1 will occur prior to July 31, 2009 and will be conducted as a third party audit. MSD will make arrangements for that audit through the National Biosolids Partnership.

A program for interim audits of the MSD biosolids management system has been prepared and agreed by KEMA and MSD. Those interim audits will be conducted annually in accordance with requirements of the NBP Biosolids EMS Program.

4. DETAILED AUDIT RESULTS

The following describes the results of KEMA's audit of each management system process used by MSD in managing biosolids activities and the level of conformance of that process with all applicable requirements of the EMS Elements. Nonconformances remaining open are noted. MSD has prepared Corrective Action Plans for those nonconformances that KEMA has approved.

4A Audit - EMS Documentation

Process Description

EMS procedures and practices are described in MSD EMS Manual. This manual includes requirements that correspond to the EMS Elements, organized into 8 sections – Introduction, Management Involvement, Roles / Responsibilities / Competency, Compliance, Improvement, Operational Control, Emergency Procedures, Nonconformance & Audits. The manual is available on the MSD intranet. The MSD EMS Manual audited was dated March 2008. Details of the Documentation Review are described in the appendices of this report.

Audit Results

The EMS Documentation was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations, except as noted below.

Minor Nonconformance 08-01/Element 1 EMS documentation is not consistent with NBP requirements in some areas:

- each Element has been approved by an individual, however the authority of that individual is not clearly described or referenced.
- the "fenceline" included in documentation infers the EMS does not extend to external biosolids transportation and use. Exclusion of "biosolids use / disposal" is not consistent with MSD EMS Element 1 and with NBP requirements.

Opportunities

- EMS documentation could be simplified and procedures could be described in a more systemic manner.
- The need for operational controls (EMS Manual, Appx 3A) could identify any legal and other requirements, public acceptance requirements and potential environmental impacts to ensure the controls address these considerations.

4B Audit - Biosolids Policy

Process Description

MSD's Biosolids EMS Policy has been approved by the Board of Directors and includes commitment to the NBP Code of Good Practice. A summary "Policy Statement" is available on the MSD website and stated on a card given to employees and, upon request, to interested parties. It is also included in employee and contractor training.

Audit Results

The Biosolids Policy was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations, except as noted below:

Minor Nonconformance 08-02/Element 2 It is not clear how performance against policy commitments is monitored or assessed to ensure these commitments are integrated into MSD activities.

Opportunities

- A connection between MSD "Vision", "Mission", Core Values" and the Biosolids Policy and Goals could help integrate these principles into the MSD biosolids program

4C Audit - Biosolids Production Operations (including Maintenance)

Process Description - General

The Morris Forman plant is permitted to treat 300 MGD wet weather flow. Anything over 140 MGD is treated through primary treatment, but bypasses the secondary treatment. Incoming flow is disinfected with sodium hypochlorite and dechlorinated with sodium bisulfite before entering the Ohio River. MSD consists of 22 treatment plants of varying sizes and maintains over 300 lift stations. All solids generated from these other treatment plants are transported to Morris Forman via pipeline or tanker truck, which attributes to the large volume of solids handled through the MF plant.

Operational control(s) for each critical control point are identified in the MSD EMS Manual (Section 3). These operational controls, along with training and awareness, monitoring and measurement and legal requirements were reviewed during each process audit. In addition, transaction tests were performed to verify effective communication and review of operational controls for regulatory requirements in a systematic manner. Identified critical control points and operational controls are consistent in scope with the National Manual of Good Practice.

Pretreatment & Collection

An active industrial pretreatment program issues permits and monitors significant industrial users, including sampling and inspections. Influent to the Morris Forman plant is monitored continually, including daily tests. A FOG program is being developed based on EPA recommendations, including inspections by certified haulers. Extension of the MSD Biosolids EMS concepts, including training, contractor control, critical control points and operations control to pretreatment operations is underway but not yet been completed.

Wastewater Treatment, Solids Handling, Conditioning & Storage

Anaerobic digesters treat the primary solids. Secondary Waste Activated Solids, including incoming solids from other MSD plants, are thickened using dissolved air floatation and blended with the digested primary solids. Solids are dewatered using centrifuges with emulsion polymer addition. The solids are pelletized and dried to approximately 94% solids. Screen sieves are used to control the pellet size and only pellets that meet the desired size range are sold. Pellets that don't meet size requirements are sold at reduced prices. An odor control system is in place for minimizing odor.

Pellets are tested frequently during the day to ensure desired quality, with results recorded and available on the site intranet. Pelletized biosolids are stored in above ground hoppers, which can hold up to one week's worth of production. Delivery trailers are loaded directly from the hoppers with the intention of delivery to approved land application sites(customers) the same day. An MSD employee is present during the truck loading process and ensures the truck is properly filled and

weighed and that the driver has an MSDS, a bill of lading, and a brochure providing additional information about Louisville Green product. Shipments are made to customers based on input from the contracted Sales Agent.

MSD personnel in the wastewater treatment, biosolids stabilization, drying, storage and transportation areas demonstrated understanding of their job duties and the basic concepts of critical control points and operational controls for their work area and the need to maintain the product quality. SOPs are available in hard copy and electronically in process areas. Frequent communications occur between plant areas and with Supervisors. Operators (Process Technicians) are qualified and training is up to date.

Maintenance

The Maintenance Department includes maintenance planners, mechanics and I&C Technicians who are qualified based on skills and on the job assessments. Daily meetings are held with Operations to communicate ongoing matters and a work order system is used to identify maintenance work needed. O&M Manuals are used to control maintenance activities for each piece of equipment. The electronic SAP system is used to generate preventive maintenance requirements and completion of PM work is tracked. Operations and maintenance personnel meet daily to prioritize repairs.

Audit Results

The processes described above were found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

Opportunities

- Documented procedures for receiving chemicals could be helpful in ensuring chemicals are handled safely and reduce the risk of incidents.
- More inspection of incoming vehicles intended for transporting biosolids could improve safety, emergency preparedness and security for that transportation.
- Uncompleted preventive maintenance tasks ranging from 30% - 60% monthly in some areas could be addressed through the EMS CAPA process.
- Review of plant conditions (as requested by MSD senior management):
  - Housekeeping could be improved (equipment not put away, small spills not cleaned up, leaking equipment, trash and scrap material left on floor)
  - Tripping hazards, obstructions could be eliminated on walking / working surfaces
  - Loose electrical cables could be eliminated
  - Vehicles parked onsite in “no parking” zone could be removed
  - Security checks of incoming vehicles could be more consistent
  - Tree should not be growing in oxygen generation area
  - Rusty, equipment, pealing paint could be repaired for better appearance
  - Fire extinguishers should not be left on floor in precarious locations
  - Inspections of eye wash stations could be more up to date

4D Audit - Biosolids Use & Disposition

Biosolids Land Application

MSD produces a Class A EQ biosolids product, referred to as "Louisville Green", which is used primarily on agricultural land at farms in Kentucky, Indiana and other States, including Georgia, South Carolina, Arkansas, Illinois, Missouri, Virginia, Kansas, Wisconsin, and Tennessee. Customers and shipments of Louisville Green are arranged by a marketing agent (A-J Inc.). That agent also reviews the sites where material is being applied. A contract "Service Agreement" and Memorandum of Understanding specify A-J responsibilities. MSD oversees the contracted operations through periodic inspections to ensure consistency with EMS requirements and compliance with State and federal requirements.

Audit Results

The processes described above were found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations, except as noted below:

> Major Nonconformance 08-04/Element 7 No Service Agreement exists with the marketing agent for biosolids and there is no clear definition of responsibilities for communication, operational control, emergency preparedness, training, recordkeeping, monitoring / measurement (inspection) in biosolids use areas.

Opportunities

- Use of the term "organic" in promoting Louisville Green could be reviewed in consideration of US Dept of Agriculture Organic Food Production requirements.

4E Audit - Communication

Process Description

Extensive communication meetings occur within the plant to discuss operating details , maintenance items and product quality. A Louisville Green Team, including management and employees, meets bi-weekly to discuss operations and quality issues and to make and implement improvement suggestions. Several members of the LG Team are also on the EMS Core Team that discusses and implements changes in the management system.

Public communications with the public and other interested parties is done by attending various public associations, attending famer meetings in the area, conducting plant tours, issuing newsletters that describe biosolids activities and through the interactive MSD website. Product brochures that are readily available are used to describe the Louisville Green material and its uses. A Material Safety Data Sheet is also available. Communications with regulators is through monthly and annual reporting and State and Federal regulators interviewed stated these reports are timely and complete. Most direct communication with Louisville Green users is done by the Sales Agent (A-J Inc.). Given the acceptability of Louisville Green, the level of public communication and public input are consistent with the level of public interest.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

Opportunities

- The definition of "interested parties" could better describe all parties that MSD considers as stakeholders.
- The Rubbertown Community Advisory Council could be useful in establishing proactive communications with the public about biosolids and the MSD biosolids program.

4F Audit – Competency, Awareness & Training

Process Description

EMS training requirements and procedures are described in the EMS Manual. Competency requirements, including qualifications, are defined in job descriptions and assessed during performance reviews. Operators must have at least level 2 State certification to work unsupervised. EMS awareness training has been provided to Morris Forman plant personnel who the EMS Coordinator considers could affect the quality of biosolids being produced.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

4G Audit – Compliance (with Legal & Other Requirements)

Process Description

Procedures are in place to control operations so that regulatory and permit requirements are met at the treatment plant. Applicable legal requirements are identified through membership in industry associations and communications with regulatory authorities. Compliance of the biosolids product with Class A EQ requirements is monitored by Operators through sampling and testing, with results also discussed at weekly management meetings. Reports of biosolids quality and use are submitted to regulatory agencies. Transportation compliance is considered part of the contractor's responsibility. MSD states that the Code of Good Practice, daily testing, and 94% solids are "other" requirements and performance against those requirements is monitored either through daily product tests or internal audits.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

4H Audit - Corrective and Preventive Action

Process Description

The MSD corrective and preventive action process is intended to address EMS nonconformances and includes documenting the concern, cause analysis and action to correct the problem. Concerns found during a recent internal audit were addressed. A CA tracking log is maintained.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

Opportunities

- Corrective Action could be established as a process that includes several different ways to correct problems and escalated "top corrective actions" with cause of cause analysis to determine preventive action.

4I Audit - Critical Control Points

Process Description

Critical control points are identified in the EMS Manual (El 3) and in a table that includes environmental impacts and references operational controls at each step in the biosolids value chain. Identification of critical control points includes consideration of environmental impacts and regulatory requirements. Critical control points are reviewed by the Management Team quarterly to ensure they are up to date and changes are made as necessary. Management and staff understand the concepts of critical control points, if not always by name.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations, except as noted below.

Minor Nonconformance 08-03/Element 3 The description of critical control points in MSD EMS Manual (El 3 - scope) does not include the need to meet public acceptance requirements.

Opportunities

- Some identified "environmental impacts" related to critical control points could be more explicit in terms of actual impacts, rather than the effect on the treatment system.
- Review of critical control points on a quarterly schedule seems unnecessarily frequent. Incorporating reviews as part of the Management of Change procedure could be just as effective.

4J Audit - Document Control & Recordkeeping

Process Description

Procedures for controlling documents and records are described in the EMS Manual Element 12 (Document Control & Recordkeeping). Documents and records requiring control and the person responsible for that control are listed in that procedure.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations, except as noted below.

Minor Nonconformance 08-08/Element 12 As currently structured, the EMS Manual and SOPs accessed online can be changed without authority, meaning the documents in use may not be fully controlled by the proper authority.

Opportunities

- Records identified as requiring control in the MSD biosolids EMS could include reports that are issued to external regulatory agencies, incidents investigations.

4K Audit - Emergency Preparedness

Process Description

An Emergency Plan is in place for the entire District and an additional plan is in place for the Morris Forman plant. These plans are comprehensive and consistent and reviewed at least every 2 years. In addition, safe work practice procedures in place (such as lockout/tagout, confined space entry, Linebreaking) are considered to be part of emergency planning. All shipments of Louisville Green from the Morris Forman plant include a Material Safety Data Sheet that describes emergency procedures and contacts. All personnel at the plant have 40 hour Hazwoper qualification. Additional training is done internally, including evacuation drills.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

4L Audit – EMS Planning & Public Participation

Process Description

MSD formed a “Core Team” to plan and implement their biosolids EMS. Planning meetings are held at least quarterly. Several members are also part of the Morris Forman management team (LG Team) who are aware of input received from customers, regulators and other interested parties. Interested parties were made aware of this Verification Audit and invited to attend.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

Opportunities

- Responsibilities for the “Core Team” and “LG Team” could be defined to ensure members clearly understand the purposes of each team.

4M Audit - Goals and Objectives for Improvement

Process Description

Senior management sets a vision, mission, core values and goals for MSD and the Morris Forman management team develops goals, objectives and action plans for the biosolids program that are consistent with the MSD goals and the Biosolids Policy. Performance in meeting biosolids objectives is monitored by the LG Team and action is taken as necessary to ensure the objectives are met.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

4N Audit - Internal Audits

Process Description

An internal audit was performed in December 2007 by a team of MSD personnel. Corrective actions for findings were planned, with assigned responsibility and completion date and actions taken were reviewed to ensure they closed the nonconformance. The audit report was issued to MSD managers and available on the website.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations.

Opportunities

- Internal audits could be reduced in scope and increased in frequency to address specific program requirements and/or conditions.

4O Audit - Management Involvement

Process Description

Performance of the MSD biosolids program and implementation of the EMS are reviewed by the Core Team at least monthly and a formal Management Review is conducted at least annually. The Morris Forman Operations Manager is identified as responsible for the MSD biosolids program and understands those responsibilities. A Management of Change procedure is used to plan changes affecting the biosolids program that the Management Team considers to be significant.

Audit Results

The process was found to conform to applicable EMS for Biosolids requirements and be consistent with NBP expectations, except as noted below.

Minor Nonconformance 08-07/Element 17 Management reviews do not specifically address suitability and adequacy of the EMS.

4P Follow-up (Corrective Action) Audit.

KEMA found major nonconformances during the initial onsite audit and MSD took action to correct those nonconformances. A Follow-up Audit was then conducted within 90 days of the initial audit to verify effective correction of those major nonconformances. The following describes the results of that Corrective Action Audit.

Major Nonconformance 08-04/Element 7 No Service Agreement exists with the sole marketing agent for biosolids and there is no clear definition of responsibilities for communication, operational control, emergency preparedness, training, recordkeeping, monitoring / measurement (inspection) in biosolids use areas.

Corrective Action – A contract was signed by MSD and A-J Inc. on or about July 3, 2008 defining MSD and that contractor's respective responsibilities. In addition a memorandum of understanding was agreed to by MSD and A-J Inc. defining MSD's specific expectations for the contractor's performance, including consistency with the Biosolids Policy, external

communication, operational control, emergency preparedness, training and recordkeeping. This nonconformance is now closed.

Major Nonconformance 08-05/Element 10 Pretreatment and collection is considered as part of the biosolids program scope, however that operation is not using established MSD EMS procedures (such as management of change, corrective action), has not been fully trained in the Biosolids Policy and other EMS concepts and environmental impacts for related critical control points are not specific.

Corrective Action – Pretreatment activities were included in EMS critical control points and operational controls. All personnel received EMS awareness training and a representative from Pretreatment was added to the Core Team responsible for implementing the Biosolids Management System. This nonconformance is now closed.

Major Nonconformance 08-06/Element 12 The MSD document control and recordkeeping procedure does not fully identify documents that require control, does not clearly describe how controlled documents are reviewed / approved and does not identify all records that require control:

Corrective Action – The Biosolids Management System document control and recordkeeping procedure was rewritten to identify documents and records requiring control, define control requirements and assign responsibility for ensuring control. This nonconformance is now closed.

APPENDICES

Appx 1 List of Audit Participants

The following personnel participated in this audit. Where necessary, other employees provided additional explanations.

MSD

Allen Adams	Safety / Emergency Response Administrator
Robert Bates	Wastewater Process Manager – Biosolids
Robin Burch	QA Coordinator
Connie Davis	Internal Auditor
Greg Brewton	Electrician
David Coe	EMS Coordinator
Nanette Edwards	Loss Control Administrator
Richard Galardi	Wastewater Process Manager
Lisa Gaus	Pretreatment Manager
Tony Glore	Training Manager
Mike Griffith	Pretreatment
Derek Guthrie	Director of Engineering / Operations
Gary Halsel	Union President
Robert Meeks	Waste coordinator
Alex Novak	Operations Manager
McKinley Reed	Maintenance Manager
Norman Robinson	Process Technician
David Roth	Senior Trainer: Operations
Bud Schardein	Executive Director
Damon Talley	Regulatory Engineer (Pretreatment)
Sharon Worely	Project Manager

Other

Bob Bickner	Kentucky Div Waste Management
Clarke Fenimore	A-J Inc.
Glen Gary	Gary Farm
Jerry Hardesty	Hardesty Farms
Mike Hext	Sr. Industrial Account Manager – Waste Management Inc.
Mike Hom	Environmental Engineer, EPA Region 4
John Leonard	Terminal Supervisor/Marathon Oil Company (neighbor)
David Terry	University of Kentucky / Kentucky Fertilizer Program Coordinator

Appx 2 Documentation / Objective Evidence Reviewed

#3 MAC Start-Up Procedure
2008 Annual Solids Summary
BDMS report 2/19/08
Bill of Lading (various)
Board of Directors meeting minutes 2/25/08
Certificate of Analysis – 12% Sodium Bisulfite dated 4/4/08 + Bill of Lading (same load)
Completed sanitary work chart + drainage work orders
Completed support workchart (Jan – March 2008)
Contract Agreement between MSDand A-J Inc. (signed July 3, 2008)
Corrective / Preventive action tracking spreadsheet
Corrective actions log (May 2008) – Appx 14B
Customer list 4/2/08
Dewatering SOP 8/2001
Document Control & Recordkeeping procedure (updated 6/4/08)
Dryer training manual 11/28/01
Emergency Plan 2008
Emergency response assignment May 2008
Emergency response program 7/2007
Employee injury log / tracking records – 2007
Employee Training Record spreadsheet
EMS Manual (all sections)
Eye wash station inspections (various)
Fire extinguisher inspections (various)
Internal audit report (2/13/08) + addendum (3/16/08)
Job Ticket / Maintenance WO (various)
Letter from KY DEP 2/4/04
LG Meeting – biosolids goals & objectives 4/2/08
LG Team meeting reports (various)
Louisville Green Brochure
Louisville Green brochures (various)
Louisville Green label
Louisville Green Quality Protocol
MSD contractor expectations document
Maintenance spending log FY2008
Management Review meeting record – 8/2/07
MFWTP – Primary Operator Training Packet
MFWTP Operations daily Status report
MFWTP PM trends analysis (Jan – Apr 2008)
Modification of permit 2630 (7/9/07)
Morris Forman Focus Group meeting minutes
MSD Wastewater / Stormwater discharge regulations (1/1/06)
Operations Daily Status Report
Pellet Tracking Sheet
Primary Milestone Guide
Primary Treatment Training Booklet
Process Area Training Milestone Review Log
Process Area Training Policy
Sales Summary 2008 – Louisville Green
Sample results – Ford Motor Co 10/10/07
SCADA screens (various)
SOP for Dryers 2/11/08
Standard Operating Procedures – Southwest Pump Station
Training Authorization Form
Wallet card (handout re EMS)

Appx 3 Desk Audit Findings (by EMS Element)

The following "observations" and ":comments" were made during the review of MSD EMS Documentation (EMS Manual). Results of that review were reported to MSD 4/11/08. "Observations" can lead to EMS nonconformances if not corrected. "Comments" are for consideration only and do not require action.

Note – many of these "observations" were corrected following this documentation review. Those not corrected were included in nonconformances identified above.

Element 1 – Documentation of EMS for Biosolids

Observation

1. The "fenceline" included in documentation infers the EMS does not extend to external biosolids transportation and use. Exclusion of "biosolids use / disposal" is not consistent with MSD EMS Element 1 and with NBP requirements.
2. Each Element has been approved by an individual, however the authority of that individual is not clearly described or referenced.

Comments

- The logic used in organizing the EMS documentation into various sections could be clarified.
- The description of the EMS and how the processes interact could be expanded to help in understanding the function and purpose of the EMS.

Element 2 - Biosolids Management Policy

Observations

3. The "board-approved" Biosolids Management Policy" is referenced, but not included in the EMS Documentation and there is no approval evident for the Biosolids Management Policy Statement.

Comments

- There is no mention of how MSD ensures its biosolids policy is incorporated into programs, procedures, practices.

Element 3 - Critical Control Points

Observations

4. The "offsite transportation" critical control point within Solids Stabilization and Storage category is identified as "outside the scope of the Biosolids EMS". This is not consistent with NBP requirements and requires justification.
5. There are no critical control points identified for biosolids use other than "Sale and Transportation". This is not consistent with NBP requirements and requires justification.

Comments

- Environmental impacts identified for some critical control points could be more specific (e.g. "treatment problems", "air pollution") and "failure to meet air permit" is not an environmental impact.

Element 4 - Legal and Other Requirements

Observations

6. There is no written procedure for determining the applicability of "other requirements" and incorporating these requirements into the EMS and operational controls.

Comments

- It is not clear how contractors are made aware of need to comply with legal and other requirements
- The list of current legal requirements appears to be incomplete (no mention of ordinances referenced in the procedure), hazardous waste, hazardous chemical, OSHA or DOT regulations.

Element 5 - Goals and Objectives for Continual Improvement

Observations

None

Comments

- No goals and/or objectives or action plans were presented for Third Party review.
- According to MSD Element 3, operational controls are used to achieve goals and objectives, however the process for developing goals and objectives does not include review / update of operational controls.
- It is not clear how goals and objectives are integrated into biosolids management practices.

Element 6 - Public Participation in Planning

Observations

7. Element 6 says "the EMS Program" will adhere to the Code of Good Practice" as its policy". It is not clear what "the EMS Program" is and the "policy" noted elsewhere in the EMS docs is more extensive than only the Code of Good Practice.

Comments

- While several ways of obtaining public input are noted, it is not clear how that input is used in planning the EMS / Biosolids activities.
- Element 6 provides general statements about how public input is used. Will need to verify these practices are in place.
- "Consideration" of public / interested party input in planning the EMS and determining goals and objectives is referenced generally in Elements 5 & 6, however it is not clear how the relevance of that input is determined, inferring that 100% of this input is considered at each meeting. That is extremely onerous.
- El 6 references "interested parties", however describes the planning for public participation only. What about other interested parties?

Element 7 - Roles and Responsibilities

Observations

None

Comments

- It could be simpler to note contracted responsibilities w/o reference to contractor names to avoid future confusion.
- There is no reference to how MSD ensures suitable and adequate resources to execute biosolids program responsibilities.

Element 8 - Training

Observations

None

Comments

- EMS Element 8 says all employees receive EMS Fundamentals training. How is this verified?
- No mention of requiring contractors to train their employees or how contractor training is verified.

Element 9 - Communication

Observations

8. It is not clear how MSD determines if its Communications Program is consistent with local circumstances, the method of biosolids management, public communications history, and degree of current interest in its biosolids management activities.
9. Element 9 (MSD Communications Program) does not state how the Biosolids Policy, information about legal and other requirements, goals and objectives, the Biosolids Program Performance Report and Third Party Audit results are made available to the public or how interested parties are made aware of planned Third Party Audits.
10. There is no reference in the Communications Program to communications issued to interested parties other than the public (e.g. regulators, industry groups, customers, suppliers).

Comments

- Are the methods of communication noted in Element 9 the only methods, or are there others & if so, how are they verified?
- There is no description of contractor responsibilities within the Communications Program.
- More detailed description of how the various external communication mechanisms are used could help define proactive requirements for the Communications Program.
- Customers are not included in the definition of interested parties (Glossary), however they are referenced in the Communications Program. It is not clear whether customers are intended to be included as “interested parties” and how communications to / from customers is included as interested party input.
- Element 9 requirements for internal communication do not describe what information is being communicated or how 2-way communication occurs.

Element 10 - Operational Control of Critical Control Points

Observations

11. There is no identified link between operational controls and applicable legal & other requirements and it is not clear how these requirements are incorporated into operational controls.

12. The description of operational controls in Element 10 (procedures, work management systems) is not consistent with the operational controls noted in Appendix 3A (e.g. debris & grit removal, laboratory testing).

Comments

- Operational controls appear to include only procedures and work management systems. It is not clear what other operational controls could exist (e.g. operator skills, engineered controls, programs / plans in place) and how these are applied.
- It is not clear how the need for operational controls is determined.
- The Management of Change procedure (Element 4) is not referenced in Element 10 as a way of determining need for operational controls and/or changes in those controls.
- Element 10 does not say how preventive maintenance is used in controlling operations.
- There is no explanation of when contractor controls are "necessary" or how these controls are monitored by MSD.

Element 11 - Emergency Preparedness and Response

Observations

13. The term "some other issue" (Element 11) is not sufficiently specific to identify offsite emergency response requirements (Louisville Green).
14. The term "periodic" in Element 11 does not specifically define requirements for review & evaluation of emergency plans, procedures and communications.

Comments

- There is no definition of what an emergency situation is.
- The "sales agent" is referenced in Element 11, however there is no reference to emergency preparedness for transportation contractors.
- It is not clear what contractor emergency preparedness is required.
- Product stewardship requirements, including emergency preparedness, could be more clearly stated ("we work with" is not specific).
- The purpose of MSD emergency preparedness includes mitigating "public health & safety impacts". No further discussion of public health and safety occurs in Element 11.
- No reference to reviewing effectiveness of emergency plans.
- It is not clear how MSD ensures emergency response equipment is readily available.

Element 12 - EMS Documentation, Document Control and Recordkeeping

Observations

None

Comments

- Emergency Plans, Contractor Service Agreements, Job Descriptions, Training Programs, certain external documents could all be considered as documents requiring control.
- Methods for identifying the EMS Manual are noted, however there are no methods for identifying other documents requiring control.
- The document change procedure references the Management of Change procedure, however the MOC does not describe how documents are changed.

- EMS records requiring control other than those noted in Appendix 3A are not identified (e.g. audit reports, corrective / preventive action plans, biosolids program reports, relevant external communications, regulatory reports).
- The retention time and method of disposal for many required records are not stated.
- Records requiring control are not identified, except in Element 3 (operating records) and there is no reference in Element 12 to the records in Element 3.
- There is no reference to contractor doc control & recordkeeping requirements.

Element 13 - Monitoring and Measurement

Observations

15. Element 13 references Element 4 for monitoring and assuring compliance with legal and other requirements, however Element 4 does not discuss this responsibility or procedure.
16. According to Element 13, Appendix 3A includes length of time for keeping monitoring / measurement records, however that information is not included in Appendix 3A.

Comments

- Operations monitoring / measurement description in Element 13 is unnecessarily detailed.
- There is no method noted for defining contractor monitoring / measurement responsibilities (e.g. compliance).
- There is no description of how trend analysis is done on biosolids plant operations (e.g. responsibilities, actions)

Element 14 - Nonconformances: Preventive and Corrective Action

Observations

17. There is no written procedure for identifying and investigating regulatory noncompliances.
18. Procedures for determining corrective action plans do not state the need for assigning responsibility or timing for the action(s).

Comments

- Noncompliance is described as a “type of nonconformance”. This is unusual.
- “Preventive action” is mentioned throughout Element 14, however is not referenced in the scope or on the Corrective Action Plan form, leading to uncertainty about how preventive action is determined and distinguished from corrective action..
- Typically, there is a great deal more use for Corrective and Preventive Action than just handling nonconformances, however no further use of the procedure is stated in Element 14.

Element 15 - Biosolids Program Periodic Performance Report

Observations

None

Comments

- Intended content of the BMPPR does not include summaries of monitoring / measuring activities or contractor activities.

Element 16 - Internal EMS Audits

Observations

None

Comments

- There is no mention of assessing performance against policy commitments as part of internal audit program.
- Noting names of individuals should be avoided to prevent future confusion.
- Contractor activities are not mentioned as part of internal audit scope.
- Reporting audit results to “all involved” is not sufficiently specific.

Element 17 - Periodic Management Review of Performance

Observations

None

Comments

- The person assigned to lead / organize management reviews is not mentioned in the EMS Manual. This would be an appropriate place to provide that authorization.
- The report for Management Reviews stated in Element 17 does not appear to include comments / conclusions about the suitability, adequacy & effectiveness of the EMS.
- It is not clear what is meant by “other staff” referenced in this Element.

END OF REPORT