

Louisville Green Program Performance Report for 2016

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Introduction

Louisville Green's Management Team consists of Managers and Administrators throughout the Biosolids value chain from pretreatment to land application. This report summarizes performance and progress of the Louisville Green Management System in 2016.

Biosolids Summary Information and Marketer Performance

A Monthly Solids Summary spreadsheet is used to monitor the distribution of Louisville Green and the landfill of Dewatered Biosolids and Landfilled Product.

The following table summarizes the yearly distribution of Louisville Green.

Year	Total Tons Distributed	Landfilled Tons	% of Material Beneficially Used	% of Marketable Material Distributed
2010	28,211	62	99.8	100
2011	24,086	1,343	94.4	100
2012	24,731	302.3	98.8	100
2013	29,250	0	100	100
2014	20,119	1,174	77	81
2015	20,410	6,609	76	87
2016	19,820	4,190	83	96

Table 1.0

The difference between material beneficially used and the marketable material distributed is product that did not meet internal specifications. It can also represent material which is cleaned out of the process but still meets Exceptional Quality standards.

Of the 19,820 tons distributed 38% was used for agriculture in Kentucky, 62% was used for agriculture in other states. As a result, \$495,500 was generated from Louisville Green sales in 2016.

17% of Louisville Green produced in 2016 was sent to the landfill. 7% directly due to elevated Molybdenum. Beneficial Use of 86.5% saved MSD approximately \$578,754 in landfill fees. In addition, 880,904 cubic feet of landfill space was saved by beneficially using the wastewater solids and helping the environment.



Biogas from the anaerobic digestion process at Morris Forman is used as a fuel source for the rotary drum dryers. In 2016, an average of 83% of the heat demand for the drying process was fueled with biogas. An average of 17% of the heat demand was supplied by purchased natural gas. This resulted in approximately \$320,000 natural gas savings based on an average annual natural gas cost of \$3.20 per mmBtu.

Louisville Green Revenue

During 2016, MSD entered into year three with the marketer at which point MSD is paid the highest revenue. This has resulted in an increase in revenue for 2016.

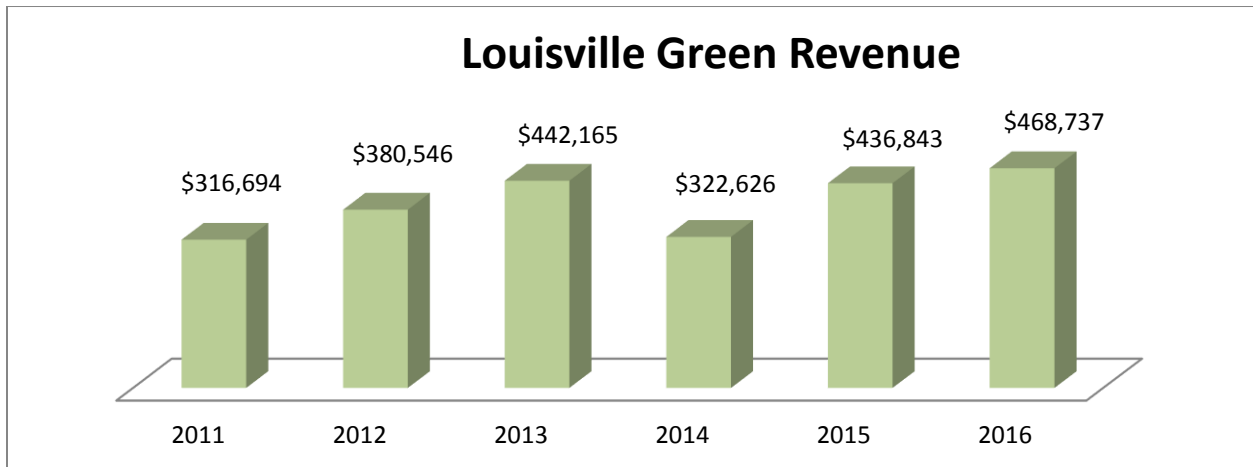


Figure 1.0

Hazardous Materials and Pretreatment Program

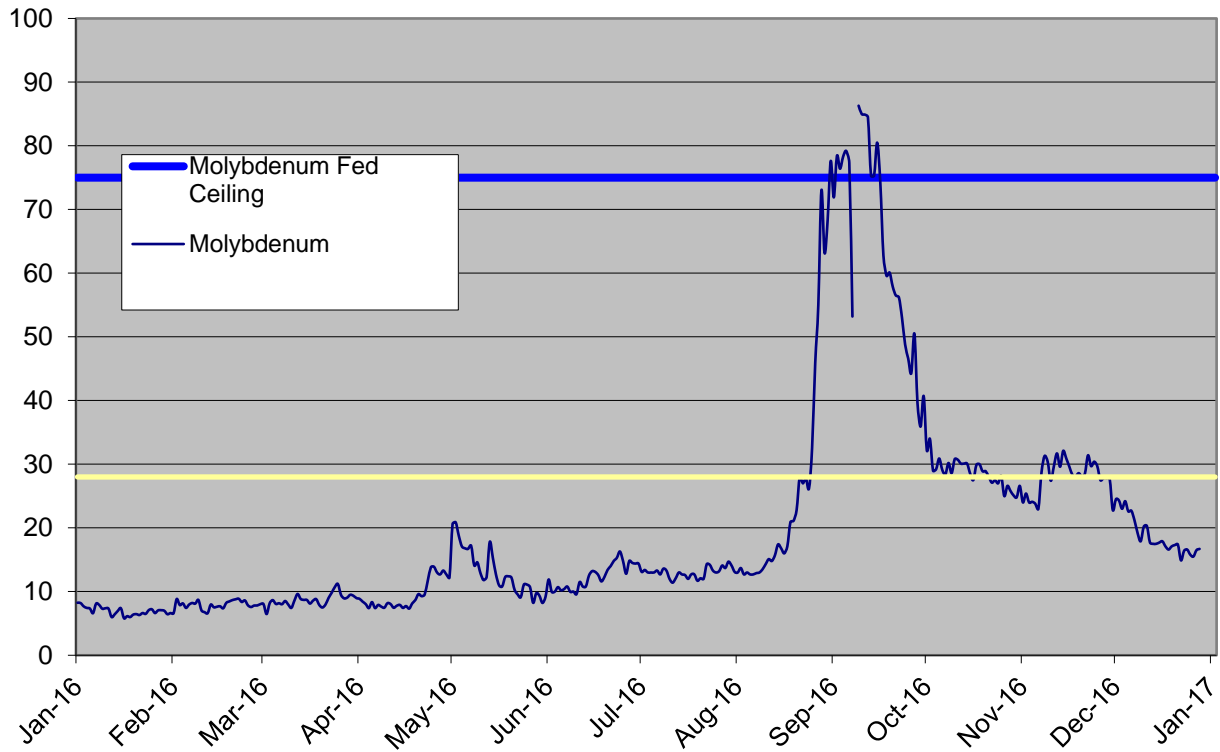
The pretreatment program issues an annual program performance report to state and federal authorities every year as part of their regulatory requirements. The report is due on March 1st of each year. Copies of the report will be available for 2016, and may be requested by contacting the Pretreatment Administrator.



Regulatory Compliance

All permit parameters for Louisville Green that was land applied were within State and Federal limits throughout 2016. However, Molybdenum exceeded the land application limit for Indiana and the Federal Limit. None of this material was distributed for land application. The material was disposed of in the landfill.

Molybdenum



Morris Forman Laboratory

The Laboratory performs the analyses for Louisville Green and all regulatory required analytical services for the following programs: KPDES, Pretreatment and Compliance, and the MS4 Permit. In addition, the laboratory provides technical support and analyses for the Consent Decree Program.

In 2016 the Morris Forman laboratory was awarded full certification for wastewater analysis from the Commonwealth of Kentucky Energy and Environment Cabinet

Table 2 is the lab's performance for the State and Federal required Discharge Monitoring Requirements Quality Assurance Program (DMRQA).

Year	Number of Acceptable Test Results	Number of Un-Acceptable Test Results	Percentage of Test Results Correctly Analyzed	DMR QA Study Number
2016	56	0	100%	#36
2015	41	0	100%	#35
2014	51	2	96.2%	#34
2013	44	0	100%	#33
2012	41	0	100%	#32
2011	47	1	97.9%	#31
2010	38	4	90.5%	#30

Table 2



Progress Towards Goals and Objectives

In 2016, regular meetings were held to discuss the year's objectives. Below are the 2016 Goals and Objectives and a summary of the outcomes. All of the objectives outlined below will be carried over into 2017.

Goal: Continually enhance the biosolids process to improve communication, efficiency, quality, and sustainability through 2018.

- Objective 1: Implement an improved Preliminary Treatment System, at the Morris Forman Water Quality Treatment Center, by December 31, 2016 to reduce the amount of debris sent to the anaerobic digesters by 500 tons by increasing the amount of screen and grit captured by 500 tons with data collection complete by December 31, 2018.
- Originating in 2013, this project continued in 2016. Work on the West Headworks was completed during 2016. The project will continue to be monitored on the action sheet as work should be complete in 2017.
- Objective 2: At the Morris Forman Water Quality Treatment Center, on no single day will 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.
- Originating in 2013, the project will be completed in 2017 and progress tracked on the action sheet.
- Objective 3: At the Morris Forman Regional Water Quality Treatment Center, 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.
- In 2014 an Engineering Consulting Group began the design for the conveyance system. Design was completed in 2015 and the project was completed in 2016.
- Objective 4: At the Morris Forman Water Quality Treatment Center, send 90% of the total tons processed between January 1, 2016 and December 31, 2016 to beneficial use.
- This objective was complete in 2016. 82% of the total tons processed were sent to beneficial use. This objective was below target due to the elevated Molybdenum in September that was sent to the landfill.
- Objective 5: Increase the resident electrical capacity of the Morris Forman Water Quality Treatment Center by 3,000 KW by December 31, 2016.
- In 2016 construction began to replace the existing Hi-Yard for the treatment plant. This objective will continue in 2017 as construction is ongoing.

Goals and Objectives for 2017 were developed in December 2016. Monthly action plan meetings will be held in 2017.



Actions Taken as a Result of Input from Interested Parties

Marketer, Farmers, Fertilizer Blenders, and the General Public

Product size distribution is an important criteria to the end user. In 2011 an enhanced capture test was initiated. The test uses 2.8mm, 2.36mm, 2.0mm, 1.7mm screens, and a pan to much more accurately determine the product size distribution. This test has continued throughout 2016 and data has been compiled.

Month	2013 Size in mm	2014 Size in mm	2015 Size in mm	2016 Size in mm
January	1.85	1.87	1.86	1.99
February	1.92	1.82	1.80	1.86
March	1.91	1.82	1.81	1.86
April	1.93	1.84	1.81	1.83
May	1.92	1.84	1.82	1.85
June	1.86	1.84	1.79	1.82
July	1.81	1.81	1.84	1.79
August	1.85	1.83	1.86	1.78
September	1.82	1.84	1.86	1.79
October	1.89	1.84	1.85	1.72
November	1.87	1.87	1.92	1.76
December	1.88	1.86	Not Available	1.77
Ave	1.88	1.84	1.84	1.82

Table 3

Pellet sizing continues to be consistent. The enhanced capture test will continue to be compared to historical data and may be used as supporting evidence for further dryer rehabilitation.

MSD Board

In 2016 there were no actions taken by the MSD Board concerning Louisville Green.

Public Participation

Public participation continued at a modest level in 2016. This year public outreach was given to 8 groups.



Training Program

During 2016, the MSD Training Department provided the training sessions in Table 4 to employees whose work is related to MSD wastewater operations.

Course	Number of Sessions
Bloodborne Pathogens	6
Confined Space Entry	4
CPR & First Aid	6
Dealing With Grease	3
Electrical NEC Training	2
EMS Fundamentals	9
Field Lab Certification Prep. Training	4
Fire Prevention and Control	2
Forklift and other equipment	15
Hazardous Materials Communications	20
Manager and Supervisor Safety Compliance Training	2
Overhead Crane Training	3
Plant SOP/Process Training	5
Process Equipment Training (wet cake pump, grit conveyor, etc.)	8
Sewer Overflow Response Protocol (SORP) Related	39
Storm Water Permit Training	8
Wastewater Lab Certification Preparation Training	7

Table 4

Several of these courses are accepted by the Kentucky Division of Water as credit hours for maintaining wastewater licenses in the state of Kentucky. All training is tracked in the Employee Training Records Database. The Operation's trainer tracks the progress of each operator at Morris Forman towards being qualified in particular areas of the plant and being certified as a wastewater operator.

In addition to training related specifically to wastewater treatment, managers and supervisors also participated in leadership development training, communications and project management training.

During 2016, overall MSD employee training attendance was 5627, in approximately 750 training sessions for a total of 1975 hours of training. See Figure 2 below.



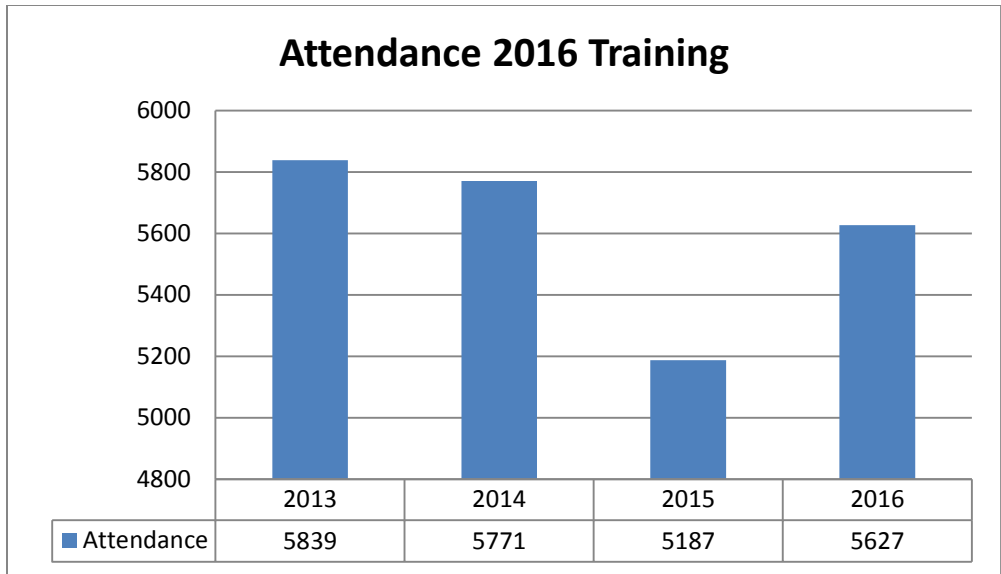


Figure 2

Accomplishments from the Training Department included:

- Continued implementation of a comprehensive management and leadership development program
- Continued implementation of the Effective Utility Management (EUM) process to use benchmarking and trending data to improve overall utility performance
- Continued meetings with LWC training staff to seek opportunities for collaboration

Community Outreach Participation included:

- Ohio River Sweep
- Kentucky Construction Career Day
- Toys for Tots collection drive
- Conducted public tours of MSD facilities
- Recruitment at Fairdale High School’s Heavy Equipment program
- Community Tree Planting Projects

Management Review

The Management Review of the Louisville Green Management System for 2015 was conducted in March of 2016. Reviewers continue to be pleased with the Louisville Green Management System.



Internal and 3rd Party Audit Results

During 2016, the Louisville Green Management System maintained Platinum status with NBP by undergoing a third party interim audit the week of June 13, 2016. NSF provided a third party auditor.

The third party audit identified four minor nonconformances and zero major nonconformances. The Louisville Green Management Team worked to resolve most of the nonconformance's by February 20, 2017. With the Auditor's permission one of the nonconformances has been extended beyond the normal timeframe to correct a minor nonconformance due to the work involved with a Third Party.

In December 2016, the Louisville Green Management System had an audit by MSD's Internal Audit staff. This audit identified no nonconformances.

The next audit in the cycle will an internal audit. The audit is scheduled for June 2017.

Nonconformances and Corrective Actions

Nonconformances from Internal and External Audits

All corrective actions from Internal and External Audits have been documented with one still in progress. The Corrective Actions pertaining to the 2016 External Audit will be closed at the next audit scheduled in June 2018.

Corrective Actions from Routine Monitoring and Measurement

Corrective actions are initiated from routine monitoring and measurement whenever there is a significant interruption in the process, a process change has occurred or an update in documentation is required. Molybdenum in the pellets continued to be the subject of the corrective actions.

