



## **Case Study: Louisville and Jefferson County Metropolitan Sewer District**

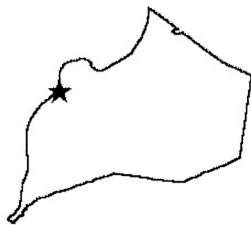
### **Profile**

The Louisville and Jefferson County Metropolitan Sewer District (MSD) is a nonprofit, publicly owned utility serving Louisville and Jefferson County, Kentucky.

Louisville is a medium-sized city located in the Ohio River Valley at the northern border of central Kentucky. The area has a temperate moist-continental climate and receives an average of about 45" (1.14 m) of precipitation annually. Louisville's major employment sectors are retail and wholesale commerce, logistics and transportation, manufacturing and healthcare.

MSD was created in 1947 by Kentucky statute, and is governed by an eight-person board, appointed by the mayor and county judge/executive. MSD provides the following services:

- wastewater collection and treatment
- storm water management and flood control
- enforcement of the local ordinances regulating erosion prevention and sediment control, and hazardous materials management
- Louisville and Jefferson County Information Consortium (LOJIC), a geographic information system (GIS)
- water-quality monitoring, in coordination with the US Geological Survey and the regional Ohio River Sanitation Commission, as well as wetlands inventories, conjunction with the US Army Corps of Engineers.



MSD serves a population of about 600,000. The service area includes over 400 square miles, with 790 miles of streams and tributaries in six watersheds, all draining to the Ohio River.

MSD's 650 employees, plus its consultants and contractors, serve about 175,000 residential, 17,000 commercial and 600 industrial customers within Jefferson and parts of adjacent counties.

MSD owns and operates 6 large (POTW) wastewater treatment plants and 25 remaining small, temporary neighborhood-scale ("package") treatment plants. MSD's wastewater and stormwater collection systems consist of approximately 2300 miles of separate sanitary sewers, 600 miles of old combined sewers, 1000 miles of separate storm sewers and 130 miles of major "improved" drainage ditches. Every year since 1995, MSD has added an average of 4,000 customers and 90 miles of new sanitary sewers to eliminate failing private septic systems and small neighborhood plants in suburban areas.

MSD takes its environmental protection and improvement responsibilities very seriously. MSD signed the CERES Principles (Coalition for Environmentally Responsible Economies) in 1990, and expanded that commitment with its Environmental Policy Statement in 1993. The CERES Principles and Environmental Policy Statement are intended to guide all MSD employees in their day-to-day activities, purchasing decisions and long-range planning.

Implementing the CERES Principles is a progressive process. The following initiatives are examples of the various environmental improvement programs that turn those words into action:

- The Greenways Program, initiated by MSD in collaboration with other agencies and environmental groups in the early 1990s, reestablishes parallel natural riparian corridors with trails for non-motorized recreation and transportation.
- Stream bank protection and restoration with native-species vegetation were integrated into the 1997 Floodplain Management Ordinance.
- The Erosion Prevention and Sediment Control Ordinance, adopted in 2000, curbs construction-related impacts to streams.
- Watershed area management, initiated in 1997, groups various activities within watersheds into integrated teams. Collection system management, combined sewer overflow elimination and control, stormwater drainage, non-point source pollution control, erosion control and flood control measures are coordinated to improve the water quality in each local watershed.
- MSD's implementation of the Green Lights program won it EPA's Public-Sector Partner of the Year in 1998. EPA also selected MSD's Main Office as one of 24 Energy Star Showcase Buildings. The returns on participation in these programs led to MSD's more recent efforts to reduce process energy consumed by pumps, blowers, motors and compressors.

Links to more information about MSD and its environmental programs include:

<http://www.msdlouky.org>,  
<http://www.msdlouky.org/insidemsd/ceres.htm>  
<http://www.nhq.nrcs.usda.gov/CCS/kentucky.html>

### **EMS Pilot Project Fenceline**

MSD will eventually include all of its operations in its formal Environmental Management Systems. The initial EMS pilot project fenceline, however, primarily addresses activities at the Morris Forman Wastewater Treatment Plant (MFWTP), the largest wastewater treatment plant in Kentucky. There are presently 85 employees within the fenceline. MFWTOP uses a high-purity-oxygen, activated sludge process and is currently under-going significant renovation. More information about the plant may be found at <http://www.msdlouky.org/insidemsd/forman.htm>

The Alternative Solids Project (ASP), now being commissioned, at MFWTP replaces a low-pressure oxidation biosolids processing system with anaerobic digestion followed by pelletization and land application. By-product methane gas will partially fuel the process. Biosolids management will be included in MSD's EMS once ASP is fully operational.

The pilot project fenceline also includes district-wide purchasing of fleet vehicles, bulk chemicals, toxic chemicals and certain pumps and motors.

## Key Drivers for Adopting an EMS

The following considerations led to MSD's decision to formalize its EMS in 1999:

- An EMS would provide more structure for integrating the CERES Principles into day-to-day operations.
- Improved individual employee performance in fulfilling environmental responsibilities would improve MSD's overall environmental performance.
- MSD's Environmental Auditing Team needed an expanded basis against which operations could be audited, per CERES Principle #10.
- MSD's leadership role in responsible environmental stewardship, locally, as well as in the wastewater "industry", would be furthered.
- The EMS would support MSD's Strategic Business Plan.
- Participating in the EPA's public-sector EMS Pilot Project would provide valuable experience-based technical assistance and training.

## Significant Aspects

Choosing significant aspects proved to be thought provoking on two accounts:

- Most activities at a wastewater treatment plant are performed for the immediate purpose of improving water quality and meeting environmental regulatory requirements. MSD also had committed to the voluntary standards of other existing environmental programs, such as Green Lights and the CERES Principles. This inherency posed the possibility that almost all activities at the treatment plant could be considered "significant environmental aspects."
- Input from the plant's staff and neighbors was solicited and used to rank the 10 significance criteria. Both groups started out ranking the same few proposed criteria alike, but soon diverged. To validate both perspectives, the criteria were equated in small, ranked groups.

Including only the aspects that were directly regulated or scored most highly when ranked by the significance criteria still yielded more than 60 environmental significant aspects. They were grouped and distilled to keep the EMS manageable.

## Objectives and Targets

MSD set objectives and targets for the following significant aspects (SEA):

1. **Improve the quality of discharges to the Ohio River**, including maximizing wet-weather volumes treated, completing treatment system upgrades, achieving full compliance with permitted effluent concentration limits, maintaining BOD and TSS discharges 25% below permit limits during normal dry-weather operations and eliminating effluent foam violations via improved defoamer control.
2. **Eliminate off-site nuisance-level odors from MFWTP processes**, based on dispersion modeling, via investigating all odor complaints within 24 hours, developing an odor control master plan and related work plan, taking the Zimpro process off-line and maintaining odor incineration, until the Alternative Solids Project (ASP) came on-line.

3. **Model exemplary hazardous materials management practices**, by maintaining full compliance with all requirements of the local Hazardous Materials Ordinance and related regulatory programs, and increasing recycling of universal wastes (fluorescent lamps, and Ni-Cd and lead-acid batteries).
4. **Maximize process energy efficiency**, by installing upgraded equipment to reduce energy consumption per unit of O<sub>2</sub> delivered by the HPO process, install sub-metering, creating and E2 Team to review 2001 CH2MHill energy audit of MFWTP, and developing Phase I of MFWTP E2 Action Plan.
5. **Reduce employee exposure to air pollutants in indoor work areas**, by maintaining zero employee exposure incidents to H<sub>2</sub>S above the eight-hour Threshold Limit Value (TLV), performing quarterly air quality monitoring and presenting interpreted results to plant staff on a quarterly basis.
6. **Improve materials purchasing**, by replacing toxic or non-biodegradable chemicals with less toxic and/or more biodegradable products where possible.
7. **Improve Material Safety Data Sheet management**, by installing MSDS tracking software, providing additional staff training and installing MSDS Hazcom boxes.
8. **Increase environmentally preferable purchasing (EPP) practices**, with special attention to energy efficiency (E2), by developing procurement procedures for non-automotive batteries, electric motors and pumps, and purchasing only CNG-fueled passenger cars, pick-up trucks and vans.

**Costs**

The man-hours associated with the development of the EMS program are found below:

Environmental Management Representatives	1709 hours
Core Team	264 hours
Other	513 hours
<b>Total</b>	<b>2,486 hours</b>

The labor costs associated with the development of the EMS program are found below:

<b>Labor Costs</b>	<b>\$67,102</b>
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**Benefits of Adopting an EMS**

MSD has seen the following initial benefits from only getting started with formalizing its EMS:

- The employees have an increased awareness, understanding and interest in the environmental impact of their work. The setting of specific objectives and targets has given MSD another

way to demonstrate to employees and external stakeholders that its environmental commitment improvement goes beyond adopting broad policies.

- The systematic review of the environmental impacts of plant activities proved valuable even before the objectives and targets were developed. In one case, environmental liability and public relations vulnerabilities were discovered when bid specifications were reviewed due to responsible staff members' participation in the EMS team training; those bid specifications were then clarified and fortified.
- The process of conducting training, defining job duty responsibilities, documenting best procedures, etc. is allowing MSD to catch the little things that might otherwise fall through the cracks of an informal EMS.

### **Lessons Learned**

1. Get upper management support. When the natural human resistance to change rears its ugly head, you'll need the backing of the boss.
2. Include both big-picture and detail-oriented people in project management. Include both managers and shop floor staff on implementation teams.
3. Let employees run with the ball when they get excited about something. Assign tasks on the basis of aptitude and interest, not necessarily the organizational chart.
4. Communicate, communicate and communicate some more.
5. Help overwhelmed middle managers to get started by developing first drafts for their review.
6. Meet with key personnel with concerns, to replace worries with understandings, and to find compromises.
7. Look for quick wins of importance to the implementation team members.

### **Next Steps**

Significant environmental aspects related to biosolids management were identified, but omitted from the EMS until the Alternative Solids Processing facilities could be commissioned. They will be incorporated at its first expansion in late-2002, via the National Biosolids Partnership.