

EXECUTIVE SUMMARY #1

KENT COUNTY DEPARTMENT OF PUBLIC WORKS **Wastewater Treatment Facility**

The Kent County Department of Public Works (DPW) Wastewater Treatment Facility (KCWTF) implemented their EMS, beginning in January 2003, through simultaneous participation in two national EMS pilot projects: 1) the U.S. EPA supported Third EMS Initiative for Government Entities (www.peercenter.net); and 2) the National Biosolids Partnership (NBP) EMS Program (www.biosolids.org). The two programs offered Kent County the opportunity to integrate the wastewater facility's EMS efforts with their on-site private sector biosolids management partner K-F Environmental Technologies, Inc and leverage the technical assistance and national recognition offered through both programs.

EMS Fenceline

- Regional wastewater collection and treatment system, including maintenance and engineering support functions and private partner biosolids operations.
- 16 MGD wastewater treatment facility with land application of a Class A biosolids.
- 59 pump and lift stations and over 45 miles of force main and main sewer lines.
- 39 staff with an additional 14 engineering staff with some responsibilities related to wastewater operations.
- Operations serve 70% of the county's population.


Key Reasons for Implementing an EMS



- More efficient use of time, monetary, and natural resources.
- Model for industries within the community.
- Ability to respond to and implement new regulatory initiatives.
- Commitment to developing a positive environmental image for the County.

Current EMS Objectives and Targets

Kent County has established Environmental Management Programs to achieve their robust quantitative EMS Objectives and Targets, which currently include:

- Reduce sulfur dioxide, particulate and CO emissions by 50% from CY 2002 levels.
- Reduce electricity usage by 20% from CY 2002 levels.
- Improve safety of existing processes or switch to alternative disinfection methods.
- Reduce Sanitary Sewer Overflows by 40% from CY 2002 levels.

 Top 3 Keys to Success	1. Active senior management support.
	2. Committed Core Team that understood the program and desired to see it completed.
	3. Participating in national EMS initiatives allowed Kent County to learn from prior participants, leveraging existing knowledge and expertise.

 Top 3 Barriers	1. It is important not to take too long to “roll out” the program and implement the EMS. Early momentum is key.
	2. It proved more difficult than originally expected to facilitate the private-public partnership and to keep all team members on the same page and committed.
	3. Many organizational layers, internal and external, have to agree to participate in the program.
 Top 3 Lessons Learned	1. It's important to undertake the project using the assistance of practitioners and experienced technical assistance providers.
	2. Active senior management involvement throughout the project, even before implementation actually begins.
	3. Interaction with team members on an almost daily basis, especially during the first stages of EMS implementation.

Resource Commitment

- 8 members on the EMS Core Team.
- 25% of time dedicated by a single Environmental Management Representative (“EMR”) to serve as overall program manager or team leader for the EMS implementation.
- Bi-weekly, one hour Core Team meetings (8 team members) during the EMS development phase and quarterly meetings during the ongoing maintenance phase of the EMS.
- One complete EMS cycle (24 months) required 2,985 total person hours at a total cost of approximately \$101,691 in direct labor resources, and about \$40,000 in other costs including national program participation (including technical assistance), travel to workshops, and third-party certification audits.

Return on Investment – EMS Benefits

- Potential energy savings of \$200,000-300,000 per year, as a result of serious consideration of installing a renewable wind energy system, an on-site bio-gas station, and/or a generator load sharing agreement.
- Effective employee succession program to contain knowledge.
- Potential reduced air pollution by 5 million pounds of carbon dioxide per year, 20% hydrocarbon emissions, 12% carbon monoxide emissions, and 12% in particulate emissions, as a result of switching to B20 biodiesel as a fuel source.
- Improved chlorine delivery system.
- 85% reduction in Sanitary Sewer Overflows.
- Improved public image and award recognition
 - 2004 NACo Achievement Award
 - 2004 Clean Water Act Pretreatment Program runner-up
 - Environmental Protection Magazine Facility of the Year

EXECUTIVE SUMMARY #2

NATICK, MASSACHUSETTS Springvale Water Treatment Plant

The Natick Department of Public Works (DPW) Springvale Water Treatment Plant implemented their EMS beginning in February 2002, through funding provided by the Massachusetts Department of Environmental Protection (DEP) Municipal Stewardship Grants program. Grants were awarded to nine municipalities and two regional organizations for projects that would promote sustainable environmental stewardship through the use of an EMS or an environmental management plan that demonstrated enhanced performance through performance measurement. Technical assistance was provided by the state DEP and the consulting firm of Woodard & Curran. The decision to implement an EMS was also in response to a November 2001 U.S. EPA Consent Agreement requiring Natick to complete a Supplemental Environmental Project.

EMS Fenceline

- Springvale Water Treatment Facilities: Treatment Plant, Pumping Facilities, Production Wells, Distribution System, and Sanitary Sewer Pumping Facilities.
- Three satellite water supply wells, two water storage tanks, 36 sewer stations, one water booster pump station, and all mechanical parts for the water distribution system.
- 26 employees operate and maintain the town's water treatment plant, water wells, and sewer pump stations on a 24-hour basis.
- Operations serve the town's population of approximately 32,000.




Key Reasons for Implementing an EMS

- Serve as a model for municipalities within the region.
- Largest chemical user in town with location near highly populated areas.
- Ability to efficiently respond to new regulatory initiatives by state DEP and Federal EPA.
- Improve image and establish a working relationship with regulators.
- Commitment to developing a positive environmental image for the Town.

Current Environmental Targets

Natick has established the following environmental targets to measure progress in meeting the Sewer and Water Division's EMS objectives for 2005:

- No spills or releases of chemicals above regulatory reporting concentrations.
- No more than five liquid/solid chemical spills or releases per year.
- Eliminate confined space in waste water pump stations by FY 2007.
- Train emergency response team to protect storm water drainage in Zone II of town drinking water wells by December 2005.
- Eliminate the use of chlorine gas as a treatment chemical at the treatment plant by December 2005.
- Maintain noise in the office space at less than 70 db by December 2005.

 Top 3 Keys to Success	1. External program participation and outside technical assistance.
	2. Proven templates and the ability to leverage practitioner tools.
	3. Technical assistance consultant with EMS experience and water systems knowledge.
 Top 3 Barriers	1. Finding consistent meeting times was difficult, especially with 24/7 operations.
	2. Personnel other than the EMS Program Manager had very limited upfront knowledge of the EMS process.
	3. Development of environmental management plans could have been more effective early on.
 Top 3 Lessons Learned	1. EMS is about continual improvement - be realistic about what it can reasonably achieve with each cycle.
	2. You cannot implement an EMS completely from scratch without outside examples and experiences.
	3. Translate EMS jargon to your organizational culture.

Resource Commitment

- Nine members on the EMS Core Team, with Strategic Oversight Committee serving an advisory role.
- 20% of time dedicated by single Environmental Management Representative (“EMR”) to serve as overall EMS program manager or team leader.
- One complete EMS cycle (Policy through Internal Audit) required approximately 1,000 total person hours at a total cost of approximately \$30,000 in labor resources and \$20,000 in consultant services.

Return on Investment – EMS Benefits

- Cost savings
 - Approximately \$40,000 avoided because a documented EMS standard operating procedure alleviated the need for back-up equipment (regulatory requirement).
 - Increased efficiency and operational consistency has resulted in a variety of cost and waste reductions (disposal cost decreases, recycled paper as a commodity, mixed compost).
- Improved ability to meet compliance requirements.
- Improved environmental awareness, involvement, and competency of staff throughout the Division.
- Improved internal and external communication of environmental issues.
- Recognition for leadership as an environmental steward.

EXECUTIVE SUMMARY #3

CAMDEN COUNTY MUNICIPAL UTILITIES AUTHORITY

Delaware No. 1 Water Pollution Control Facility - Camden, New Jersey

The Camden County Municipal Utilities Authority (CCMUA) Delaware No. 1 Water Pollution Control Facility implemented their EMS beginning in February 2000. EMS implementation was an internal decision that the Authority should utilize a systematic approach to managing their environmental, business, and community responsibilities efficiently and effectively. Technical assistance was provided by the consulting firm of Camp Dresser & McKee Inc.

EMS Fenceline

- Delaware No. 1 Water Pollution Control Facility in Camden, New Jersey.
- New Jersey's 4th largest wastewater treatment plant with a design capacity of 80 MGD and a hydraulic Capacity of 160 MGD.
- 145 employees operate and maintain the treatment plant, sewer collection system, and administration.



Key Reasons for Implementing an EMS


- Optimize performance of the treatment plant through systematic, ongoing identification of improvement opportunities.
- Better equip CCMUA staff to perform their jobs with defined roles, responsibilities, training, and procedures.
- Effectively respond to privatization pressures through internal efficiencies.
- Enhance public image, especially with regards to odor complaints.
- EMS provided a systematic, proven approach – stamp of authenticity.

Current Environmental Targets

Camden County established the following environmental targets to measure progress in meeting EMS objectives for 2005:

- Maintain suspended solids and Biological Oxygen Demand (BOD) below 20 ppm, with a target of below 15 ppm.
- Complete elimination (100%) of offsite odors.
- Maximal capture of wet weather flow, without adversely impacting water quality.

 Top 3 Keys to Success	1. Must have defined plans with accountability (i.e., who, what, by when).
	2. Routine follow-up to make sure plans are being implemented.
	3. Demonstrate a continued commitment to positive progress and ensure that all team members understand expectations.
 Top 3 Barriers	1. EMS was a relatively new and innovative approach, thus had to be sold throughout the organization.
	2. Feeling that public sector organizations are limited and that there are no “carrots” for employee motivation and buy-in.
	3. Achieving a comfort level with the program whereby employees would feel their ideas are listened to.

 <p>Top 3 Lessons Learned</p>	1. Stay persistent and hold teams and/or team members accountable for defined responsibilities and action plans.
	2. Not the same drivers as in the private sector, thus need to adapt business case and consider rate payers.
	3. Don't overlook the wealth of knowledge and experience internally within your organization.

Resource Commitment

- 70% of time dedicated by single Environmental Management Representative.
- 7 members on the EMS Steering Committee.
- EMS Steering Committee, made up of select managers and employees, met weekly during initial stages and transitioned into a quarterly or as needed meeting schedule.
- CCMUA has institutionalized their EMS to the point that EMS goals are the same as overall organizational goals. Therefore, direct labor costs spent on EMS are the same as daily direct operational costs and can no longer be differentiated.

Return on Investment – EMS Benefits

CCMUA achieved the following “low hanging” fruit by 2000, shortly after implementing their EMS:

- Regularly discharging effluent that ranged from 12-18ppm, having struggled in the late 1990's to meet 30 ppm limits on a consistent basis.
- 25% reduction in operations and maintenance costs from \$21.2 million in 1996 to \$16 million in 2000, resulting in a 6% lower rate than in 1996.
- 20% increase in tonnage of sludge removed from the plant from 46,000 tons in 1999 to 55,000 tons in 2000.
- 90% reduction in verified odor complaints from 16 in 1997-1998 to 2 in last 6 years.
- Implementation of New Jersey Department of Environmental Protection (NJDEP) approved community notification system that provides the neighboring community with 24-hour telephone access for reporting odor concerns. The hotline provides real time community input to CCMUA's EMS.
- Provided a vehicle for communication with Board, whereby monthly reports and updates became expected and valued.

Since 2000, CCMUA has continued to experience EMS benefits, including:

- Reduction of wet weather bypasses from 24 in 1999 to 2 over the last 6 years.
- Optimization of water quality through improvement to sludge thickening and dewatering, to primary and final sedimentation tanks, and operational accountabilities and goal setting.
- CCMUA now removes 60,000 tons of sludge per year, an increase of 25% since 1999.
- Reduced offsite odors by initiating a zero tolerance program.
- Cost savings by identifying inefficiencies, water reuse, and energy efficiencies. CCMUA has held its rate for 10 straight years, with three rate cuts during this period.

EXECUTIVE SUMMARY #4

OAKLAND COUNTY DRAIN COMMISSIONER'S OFFICE Wastewater Treatment Complex – Waterford, Michigan

The Oakland County Drain Commissioner's Office (OCDC) in Waterford, Michigan implemented its EMS, beginning in January 2003, through participation in the U.S. EPA supported Third EMS Initiative for Government Entities (www.peercenter.net). The Drain Commissioner's Office previously developed an ISO 9001 registered Quality Management System and in April 2005 received ISO 14001 registration. The adoption of complementary ISO principles allowed the OCDC further measurement tools to ensure the high quality standards that county residents have come to expect.

EMS Fenceline

- Two Divisions: Engineering & Construction and Operation & Maintenance.
- Approximately 260 staff members.
- Twenty units, including Project Management, Regulatory Review, Environmental Stewardship, Operations and Maintenance service for Storm Drains, Sewers, Water Supply, Wastewater Treatment, and Administration.
- Commerce Wastewater Treatment Plant, George W. Kuhn Retention Treatment Basin, Pump Maintenance Facility, Walled Lake/Novi Wastewater Treatment Plant and Water Maintenance Facility.




Key Reasons for Implementing an EMS

- Improve employee awareness of environmental issues.
- Develop a working relationship with federal and state agencies.
- Positive impact on helping customers.
- Commitment to developing a positive environmental image for the county.

Current EMS Objectives and Targets

Oakland County has established Environmental Management Programs to achieve its robust quantitative EMS Objectives and Targets, which currently include:

- Reduce high dosage chlorine flushed into waters from OCDC operation and maintenance activities by developing new standards by June 2005 and by revising OCDC chlorination procedures for disinfection.
- Reduce the amount of paper used and increase the percentage of cardboard and batteries recycled by 50% within two years.
- Reduce potential for unnecessary inflow and infiltration in the Clinton/Oakland interceptor system by repairing all sub-standard manholes by December 2005.
- Reduce potential for sewer system overflows and unnecessary inflow and infiltration in the Evergreen-Farmington Sewage Disposal System by rehabilitating all sub-standard floodprone manholes by December 2005.

 <p>Top 3 Keys to Success</p>	<ol style="list-style-type: none"> 1. Taking the time to visit each of the facilities, meet with management and employees, and discuss the initial goals and objectives. This was effective in showing support and keeping everyone updated. 2. Effective communication. It is worth the time and effort to keep everyone on the same page with consistent understanding and involvement from all levels of employees. 3. Top management involvement in setting goals and defining environmental management programs.
 <p>Top 3 Barriers</p>	<ol style="list-style-type: none"> 1. Selling the benefits of environmental responsibility to municipal customers. 2. Initial confusion associated with integrating management systems and initiatives. Many employees viewed early efforts as three separate initiatives (ISO 9001, ISO 14001, and EMS). 3. Managing resources was difficult as many employees face “competing” responsibilities on top of ISO implementation.
 <p>Top 3 Lessons Learned</p>	<ol style="list-style-type: none"> 1. Communicate early and often across all lines of the organization. Avoid early confusion. 2. Translate EMS terms into organization terms as much as possible, especially in the beginning. 3. Keep all players involved from goal setting to ensure uniformity.

Resource Commitment

- Five members on the EMS Core Team.
- 477 hours dedicated by a single Environmental Management Representative (“EMR”), over a two-year period, to serve as overall program manager or team leader for the EMS implementation.
- Semi-monthly Steering Committee meetings (top management and EMS Core Team) were held during implementation, and monthly meetings continue.
- One complete EMS cycle (24 months) required 2,646 total person hours at a total cost of approximately \$130,559 in direct labor resources.

Return on Investment – EMS Benefits

- Retention of “institutional experience” which previously left with the retirement or transfer of key veteran employees.
- Employee ownership of managing environmental impacts, resulting in ideas and suggestions for improvement.
- ISO 14001 Third-party Registration.
- Benefit of having an integrated Quality and Environmental system
 - Cost savings
 - Utilize and build on existing systems
 - Avoids confusion

EXECUTIVE SUMMARY #5

CITY OF LOWELL, MASSACHUSETTS Regional Wastewater Utility

The Lowell, MA Regional Wastewater Utility implemented their EMS beginning in August 1997 through participation in the U.S. EPA supported First EMS Initiative for Local Governments (www.peercenter.net). The Utility proceeded to achieve ISO 14001 certification for all divisions in August 2000 becoming the first wastewater utility in the nation to achieve this distinction.

EMS Fenceline

- Lowell Wastewater Utility – an activated sludge facility with a design flow of 32 million gallons a day (MGD).
- Provides primary and secondary treatment to more than 180,000 users in five communities.
- The system includes 230 miles of sewer lines, 5,000 catch basins, 5,000 manholes, and 46 employees.




Key Reasons for Implementing an EMS

- Enhance the City's overall image;
- Improve environmental performance;
- Help lead the region's public sector toward compliance with the ISO standards through education, training, and awareness;
- Maximize efficiency, reduce costs, and avoid costly environmental emergencies thereby saving taxpayers money; and
- Compete with, and be better than, the private sector.

Current EMS Objectives and Targets

Lowell has established Environmental Management Programs to achieve their robust quantitative EMS Objectives and Targets, which currently include:

- Reduce impact on wastestream
 - Increase waste recycled by 5% by 12/31/05
 - Maintain program aimed at increasing public awareness in 2005
 - Eliminate sludge disposal to landfill
- Energy Conservation
 - Continue to reduce Kw usage by 12/31/05
- Improve chemical management
 - Achieve zero spills in 2005
 - Continue to quantify state regulated waste disposed by end of 2005
- Odor reduction
- Not to exceed previous year's odor complaints
- Improve industrial effluent
- Establish inter-departmental new business awareness program

 <p>Top 3 Keys to Success</p>	<ol style="list-style-type: none"> 1. Hard working and dedicated staff. 2. Supportive upper management, including City Manager, City Council, and other elected officials. 3. Hiring an external consultant to assist with document control and the development of the EMS manual.
 <p>Top 3 Barriers</p>	<ol style="list-style-type: none"> 1. Time and resource allocation – educating employees about the ISO concept and conducting implementation activities can be time consuming. 2. Lack of active support and buy-in from the community. 3. Staff turnover, including the loss of key Core Team members.
 <p>Top 3 Lessons Learned</p>	<ol style="list-style-type: none"> 1. Hire an external consultant to support early implementation and training efforts. 2. Add an additional facility within the original EMS fenceline to eliminate duplicating efforts down the line. 3. Development of metrics proved to be one of the most difficult EMS elements, as this practice was still relatively new in the municipal sector.

Resource Commitment

- 14 members on the original EMS Implementation Core Team, including the Executive Director, with 7 members currently on the EMS Team.
- 10% of time dedicated by a single Environmental Management Representative (“EMR”) to serve as overall program manager or team leader for the EMS implementation.
- Bi-weekly Core Team meetings (14 team members) during the EMS development phase and less frequent, focused meetings during the ongoing maintenance phase of the EMS.
- One complete EMS cycle (24 months) required 1,424 total person hours at a total cost of approximately \$27,100 in direct labor resources, \$10,500 in consultant costs, and about \$4,800 in other travel and material costs.

Return on Investment – EMS Benefits

- Lowell became the first municipal facility in the U.S. to certify all of its divisions to the ISO 14001 Standard.
- In the first three years, Lowell realized several direct cost savings of over \$180,000 (some annual savings) through recycling and energy reductions.
- In 2004, Lowell accomplished the following results:
 - 46,893 total lbs of materials recycled
 - 110 total gallons utility used oil recycled
 - 140 total gallons citizen oil recycled
 - 1,520 total linear feet of fluorescent bulbs recycled
 - No reportable chemical spills
 - Odor complaints reduced by 50% from 2003 levels