

ENVIRONMENTAL MANAGEMENT SYSTEMS AS A COST-EFFECTIVE ALTERNATIVE TO PRIVATIZATION

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ABSTRACT

The Camden County Municipal Utilities Authority (CCMUA) operates an 80 million gallon per day (MGD) pure oxygen activated sludge sewage treatment plant located in Camden City, N.J. It also operates a 100 mile regional sewer collection system and 25 pumping stations ranging from 1 MGD to 54 MGD in capacity.

The CCMUA has identified three fundamental goals that are critical to the success of its operation:

- 1) Optimization of Water Quality Performance
- 2) Optimization of Air Quality Performance
- 3) Cost Minimization

In order to meet these goals, the CCMUA first undertook a privatization process for the purpose of soliciting private, external expertise in the wastewater treatment field. At the same time, the CCMUA also implemented an Environmental Management System (EMS) to optimize internal performance and to offer another, in-house, alternative to the privatization proposals submitted. Ultimately, the CCMUA found that implementation of an EMS resulted in improvement in water quality and air quality performance and in significant cost reductions. More importantly, the CCMUA found that the improvements realized through implementation of the EMS were collectively more attractive than the benefits offered through the privatization proposals. Accordingly, the CCMUA remained a public entity. This paper will discuss the benefits of implementing an EMS and also discuss how implementation of internal improvements, through an EMS, can bring about results that are comparable or actually better than those realized through a privatization process.

KEYWORDS

Environmental Management System (EMS), wastewater treatment plant, privatization, cost minimization.

INTRODUCTION

The Camden County Municipal Utilities Authority (CCMUA) operates an 80 million gallon per day (MGD) pure oxygen activated sludge treatment plant located in Camden City, NJ. It also operates a 100 mile regional sewer collection system and 25 pumping stations ranging from 1 MGD to 54 MGD in capacity.

The CCMUA treats about 58 MGD per day generated within Camden County, NJ. Camden County has an area of 226 square miles and a population of about 500,000. It is comprised of 37 municipalities including Camden City, the county seat.

The wastewater is treated at the CCMUA's Delaware No. 1 Water Pollution Control Facility (WPCF), New Jersey's 4th largest wastewater treatment plant with an average dry weather capacity of 80 MGD and a peak capacity of 160 MGD. Two of the municipalities discharging to the Delaware No. 1 WPCF (Camden City and Gloucester City) have combined sewer systems. In addition, although the other 35 municipalities have separate systems, they are prone to contribute a substantive quantity of infiltration/inflow. As a result, flows increase significantly during wet weather events.

The Delaware No. 1 WPCF achieves primary treatment through its primary sedimentation tanks, and secondary treatment through its eight pure oxygen aeration tanks and its eight secondary sedimentation tanks. Disinfection is accomplished via application of sodium hypochlorite. Primary and secondary sludge is collected and dewatered through belt filter presses. The dewatered sludge cake is currently disposed of off-site.

The wastewater treatment plant and the regional sewer collection system were completed in 1991. However, because of reduction of federal funding of the USEPA's Clean Water Act grants, the majority of the construction was funded through low interest loans from the State of New Jersey's revolving loan program, the New Jersey Wastewater Treatment Financing Program. In 1995, the CCMUA was obliged to begin paying back these loans and other borrowings. As a result, debt service payment requirements increased dramatically and the CCMUA was forced to increase its rates by 22½%, from \$275 per household per year to \$337.

Naturally, the CCMUA's Board of Commissioners, and other policymakers, wanted to explore every feasible option to reduce costs and rollback this substantive rate increase.

In addition, the treatment plant was struggling to meet its state discharge limits, even though the plant was receiving dry weather flow of only 70-75% of its rated treatment capacity. Although the plant was relatively new, maintenance problems were already beginning to surface. Finally, the wastewater treatment plant happens to be located in the middle of an urban neighborhood. Therefore, even normal operation of the plant could result in odors to the neighborhood, and there were many complaints from the public. Coupled with the 22.5% rate increase mentioned above, it was clear that there was significant room for improvement in all aspects of the CCMUA's performance.

At the same time (mid-1990's), privatization happened to be very much in vogue as an opportunity to apply private sector cost minimization incentives and efficiencies to municipal services, like wastewater treatment. Accordingly, the CCMUA issued a Request for Proposals (RFP) for a twenty-year contract for operations, maintenance and management of its wastewater treatment and conveyance facilities.

PRIVATIZATION PROCUREMENT PROCESS

In any Request for Proposals (RFP) or bidding process, the success of the process is greatly dependent upon the quality of the procurement document. For this reason, the CCMUA assembled a project team, comprised of its Bond Counsel, Financial Advisor, Consulting Engineer and Deputy Executive Director, to prepare the RFP. Key elements of this RFP included:

- 1) Minimum technical requirements for the purpose of qualification – specifically, the bidders needed to demonstrate that they had sufficient experience in operating a pure oxygen, activated sludge, wastewater treatment plant of at least 20 MGD capacity (the CCMUA’s plant has an 80 MGD capacity). The vendor also needed to demonstrate experience in operating and maintaining regional sewer collection systems. Not only did the CCMUA require that the vendors have the institutional experience required, but also that the individual managers and operators proposed for the project should have sufficient experience with facilities similar to the CCMUA’s.
- 2) Minimum financial requirements for the purpose of qualification – the vendors also had to demonstrate sufficient financial wherewithal to undertake a 20-year contract estimated at \$400-500 million over the life of the agreement. The CCMUA was specifically concerned about two things above all – default and substantive capital repairs due to inadequate operations and maintenance.

A municipal entity that has decided to privatize its operations is especially vulnerable if the private vendor it has contracted with defaults without adequate advance notice. This is because a municipal wastewater treatment plant cannot temporarily cease operating if needed, the way a factory can, and because of the extensive amount of time needed to either procure a replacement vendor or to reassemble a municipal staff. In addition, the private operations and maintenance contractor does not own the facilities it manages so it has no incentive to maintain them for longer life. In fact, the private vendor’s incentive is to minimize maintenance costs. So, the municipal entity is at risk for significant capital repairs if insufficient operations and maintenance practices are implemented for a sufficiently long period of time.

For these reasons, the CCMUA’s RFP required a performance guaranty in the full amount of the contract plus access to an unlimited letter of credit which would enable it to procure an emergency replacement in the event of default and/or accomplish capital repairs in the event of significant non-performance of operations and maintenance responsibilities.

- 3) A draft generic agreement between the CCMUA and the vendors. Although the CCMUA knew that negotiation of the contractual agreement would ultimately be individualized to the specific proposers and their proposals, a generic agreement was developed and included with the RFP to establish guiding principles that the CCMUA would be seeking.

The CCMUA received submissions from three entities but only one proposal was a legitimate response to the RFP; the others were alternative suggestions for improvement, not an actual operations and maintenance management proposal. With only one respondent to negotiate with,

the CCMUA did not have the benefit of price competition among firms vying for the contract. This was a very significant disadvantage. As a result, some thought was given to reissuing the RFP in order to attract more proposals. However, ultimately the decision was made to negotiate with the one responsive respondent and use the “reject and reissue” option as a fall back strategy in case negotiations with the vendors were unproductive.

PRIVATIZATION CONTRACT NEGOTIATIONS

The privatization contract negotiations can be divided into two distinct categories – (1) contractual terms and (2) pricing. As the following discussion will show, the negotiations that followed for both categories clearly illustrated both the pros and the cons of privatization.

The private sector contractor is not restricted by such public sector concerns as Civil Service requirements and bureaucratic red tape. Moreover, since it is governed by the profit motive, it has greater capacity to provide individual incentives to its workers to achieve the desired efficiencies. However, these advantages are advantages that are realized by the private contractor itself; they are not automatically passed on to contractor’s public sector employer unless the governing contract is crafted carefully to channel the private sector’s efficiencies to the public benefit.

Perhaps the most important example of this principle is the elimination of as many loopholes as possible from the contract terms and conditions. Loopholes permit a contractor to offer misleading artificial savings that would be apparently realized from the base contract price, but subsequently lost through change orders and other hidden costs. Some examples of important loopholes to eliminate in privatization contracts include, but are definitely not limited to:

- 1) Maintenance Costs vs. Capital Costs – Most operations and maintenance privatization contracts call for the private vendor to be responsible for maintenance costs while the owner retains responsibility for capital replacement costs. Therefore, an artificially low maintenance charge might indicate initial savings in the beginning of the contract. However, over time, under maintained facilities will eventually require earlier, and/or more frequent, capital replacement resulting in a net loss to the owner, and the ratepayers. Accordingly, it was important to incorporate a standard maintenance program into the contract itself, and strong provisions requiring performance of the contractually required maintenance standard.
- 2) Operating Costs vs. Environmental Performance – The private contractor has a very strong profit motivation. It will have the incentive to minimize operating costs, in order to maximize profits. For example, if a municipal wastewater treatment plant has a NPDES discharge permit limit of 30 parts per million (ppm) for suspended solids, the private contractor will have an incentive to strive for an effluent quality of 29.99 ppm since any additional solids captured prior to discharge to the river result in additional solids processing and disposal costs. In order to combat this, the CCMUA included in the contract a baseline limit of 25 ppm (based on historical averages), and a formula for calculating the marginal cost of deviations from the baseline. Then the contractor would actually receive a bonus if the effluent quality exceeded the baseline level. Conversely, the contractor would be penalized if the effluent quality was worse than the baseline level, thereby eliminating the financial incentive to reduce effluent quality

compared to the municipal operations.

3) Maintenance of Financial and Technical Wherewithal – Many things can happen during the life of a twenty-year contract, including erosion of the private operator’s financial and/or technical capabilities. For this reason, the CCMUA included contractual provisions which gave it specific rights should the firm be bought out, change parents, merge etc., in such a way that it would no longer meet the original minimum financial requirements set forth in the original Request for Proposals.

Analogously, the CCMUA also required the firm to maintain the level of technical expertise guaranteed in the original proposal. That is, if the project manager or the plant operator left the firm or was reassigned, then the contract required replacement with an individual of equivalent experience. In this way, the contract protected against utilization of less experienced, lower priced project team members in years 2-20 of the contract in order to save money and increase profits.

These measures, and others, were written into the contract after laborious, but worthwhile negotiations with the vendor. They provided significant disincentives to the contractor to provide a seemingly attractive, but artificially low, price since many of the avenues for making up for the low initial price, and realizing unseen profits later, were eliminated.

As a result, the CCMUA believed that it had negotiated a reasonably fair contract, at a reasonably good price, with the vendor. However, it still had the disadvantage of having only received one proposal and not having the cost-reducing benefit of price competition. It could only compare the contractor’s proposed price to its own internal costs in order to ensure that sufficient savings would be realized from the privatization contract. When a review of the contractor’s initial cost proposal suggested relatively modest cost savings, particularly in light of some of the risks associated with privatization, the CCMUA decided to implement internal improvements, ultimately through adoption of an environmental management system, in order to have a cost-effective alternative to the privatization proposal being negotiated. This would have the dual benefit of (1) providing the pricing competition that was otherwise absent due to the receipt of only one proposal and (2) providing a cost-savings, performance improving alternative should negotiations with the contractor prove unsuccessful.

IMPLEMENTATION OF INTERNAL COST REDUCING MEASURES AS ALTERNATIVE TO PRIVATIZATION

As a municipal utilities authority, the CCMUA’s core mission objectives are:

- 1) Optimization of Water Quality Performance
- 2) Optimization of Air Quality Performance
- 3) Cost Minimization

While all of these objectives are of great, and reasonably equivalent, importance, during the privatization process, cost minimization was the most important because if the CCMUA could not reduce its internal costs in order to become a cost-effective alternative to privatization, then the other two objectives would have to be realized through management of the private operations

and maintenance contract. So, the focus of internal improvement was, initially, mostly upon cost minimization.

The CCMUA identified five major cost centers for its operations and maintenance function:

- B salaries and benefits
- B sludge disposal
- B utilities
- B maintenance
- B chemicals

The CCMUA knew that sludge disposal was the most glaringly cost inefficient part of its operations. Specifically, it had been operating a 50 dry ton per day in-vessel composting facility that had fallen far short of its projected performance. This composting facility turned out to be very maintenance intensive and, as a result, had a lot of down time. In addition, when it was running, it was unable to process the CCMUA's full sludge throughput on a consistent basis. As a result, the CCMUA was obliged to not only run the 50 dry ton per day composting facility at less than half of its capacity, with all of the attendant fixed costs, but also had to outsource the balance of its sludge, often on an emergency, high cost, basis. As a last straw, operation of the composting facility often resulted in emissions of significant odors from the treatment plant, which is located in the midst of an urban residential neighborhood.

For these reasons, the CCMUA went on a very aggressive search for alternative methods of sludge disposal. Specifically, it went to neighboring and nearby counties and offered to pay to utilize any spare sludge capacity that their facilities might have. Many of our neighbors declined, but enough accepted to provide for complete distribution of all of our sludge at an aggregate cost of about half of the cost to operate the composting facility. Accordingly, the CCMUA closed the composting facility and entered into long term sludge disposal contracts with three of its neighboring contracts. This enabled the CCMUA to reduce its operations and maintenance costs by about \$2 million per year.

Consequently, the CCMUA's operations and maintenance costs were now virtually the same as the price offered by the private contractor. Although the private contractor ultimately lowered its price a bit through subsequent negotiations, the projected savings were much less than originally projected when the proposal was submitted. This suggested that the contractor had probably planned to close the composting facility itself had they received the contract. It also suggests a general rule of thumb to municipal entities contemplating privatization – try, if possible, to eliminate obvious areas of cost-inefficiency before entering into a private operations and maintenance contract. In this way, the ratepayers gain 100% of the benefit of the innovation and don't have to share it, at best, with the private vendor.

The other main cost-reducing measure undertaken by the CCMUA was to reduce its staff, through layoffs and attrition. When the privatization process started, with the formation of the RFP Development Committee, the CCMUA had 229 employees. By the end of the process, it was down to 180 employees (it is now down to 150 employees). The contractor had planned to reduce staff if it was awarded the contract. By reducing staff itself, the CCMUA further

narrowed the gap between its operations and maintenance costs and the pricing proposal submitted by the contractor.

For these reasons, the CCMUA ultimately rejected the privatization contract. But the privatization process had been absolutely invaluable to the CCMUA. Without the opportunity to compare itself to, and compete with, the private sector model of cost and operational efficiency, it would never have been able to reduce its own costs to the degree it did. As a direct result, the CCMUA was able to reduce its rate three times during the four years from the beginning of the privatization process.

Now the main challenge was to build on this heady experience and sustain the improvement process in the absence of direct competition from the private sector.

WHAT CAME NEXT – IMPLEMENTATION OF AN ENVIRONMENTAL MANAGEMENT SYSTEM

One of the first things that the CCMUA did to sustain the momentum toward improvement was to implement an environmental management system (EMS). An EMS is comprised of interrelated processes designed to improve environmental performance. Accordingly, implementing an EMS was a natural next step for the CCMUA in the aftermath of its rejection of the proposed privatization contract. By implementing a well-designed EMS, CCMUA staff would be better equipped to perform their jobs and the CCMUA would be correspondingly better able to optimize the operating performance of the treatment plant with respect to effluent quality, sludge handling and odors. The EMS would also help in discovering additional opportunities to reduce waste and corresponding cost reductions. Furthermore, the development of an EMS sent a strong and clear signal to regulators, the public and employees about the CCMUA's commitment to a cleaner environment and to continue its cost minimization efforts.

The CCMUA had rejected the privatization contract in September of 1999. Its EMS development efforts began in February, 2000 and the EMS manual and system were in place by September, 2000, within one year of the end of the privatization process.

The major steps involved in development of the EMS were:

- B Gap analysis
- B Team chartering
- B Awareness training
- B EMS manual development
- B Sustained implementation

GAP ANALYSIS

As the first step in the EMS development and implementation program, an assessment of CCMUA's existing environmental management policies and procedures was undertaken. Available manuals and documents were reviewed, interviews were conducted with key staff, and operational processes were observed. This assessment was undertaken to determine the current

status of operations at the CCMUA's Delaware No. 1 WPCF with respect to the Natural Enforcement Investigations Center (NEIC) EMS requirements – both to identify areas that were already being performed satisfactorily, as well as those areas that need additional improvement. Because of its comparative nature this initial review is sometimes termed a “gap analysis” and is a requirement of the NEIC multimedia EMS developmental model process.

The gap analysis rated the CCMUA existing system(s) against the level of development needed for the EMS to meet the NEIC requirements. A questionnaire reviewing each element of the NEIC standard was used in the assessment. The gap analysis identified areas that organizational structure and communications were most significant areas requiring improvement, and provided information that was subsequently used in the development of the CCMUA EMS Manual (CCMUA, 2000).

TEAM CHARTERING

The next step in the EMS implementation process that the CCMUA undertook was the chartering of the EMS development teams. This effort included the identification of the EMS program manager, a critical role in the success of any EMS project, the EMS steering committee and the EMS implementation team members. For the CCMUA EMS, the EMS program manager and the steering committee members were selected from CCMUA's executive staff, while the implementation team members were selected from among the top managers at the treatment plant. Individuals were selected to represent a broad range of expertise needed to develop the EMS.

CCMUA identified a single individual, who had in-depth knowledge of CCMUA's environmental programs and who had a significant degree of authority, to act as the EMS program manager. The primary responsibility for a successful EMS implementation would reside in that person. Assigning this position required the full backing from the CCMUA commissioners to demonstrate that the EMS implementation is an important organizational goal. The EMS program coordinator would work closely with, and direct, the activities of the EMS implementation team. This approach offers the advantage of a single point of responsibility for the EMS, without which the ultimate accountability may become diffused. The appointment of the CCMUA deputy executive director as EMS program manager by the CCMUA Board of Commissioners represented a commitment to the success of EMS development at the highest levels of the company.

The EMS implementation team and steering committees included the key individuals who will be responsible for leading the organization and driving the adoption of the EMS program. The EMS Implementation Team would bear much of the responsibility and must provide the initiative to sustain the EMS development activities.

Successful EMS implementation requires that key members of the organization “take ownership” of the EMS and make it part of their day-to-day routine. To ensure this ongoing commitment, CCMUA established an EMS implementation organizational structure that clearly identified the roles, responsibilities, and authorities of the important functional units, management positions, and other individuals who have responsibility for implementing and sustaining the EMS.

AWARENESS TRAINING

Awareness training was provided to EMS Steering Committee and Implementation Team members to ensure that they were familiar with the CCMUA EMS development goals and their role in the process. The key components of this training addressed:

- § Roles and responsibilities of the EMS program manager, EMS implementation team, and steering committee
- § Overview of how an EMS is developed and implemented
- § Process for identifying environmental aspects of the facility's activities and operations and assisting the organization in determining which environmental aspects are considered significant
- § Process for setting objectives and targets and developing action plans to meet these objectives and targets, and
- § Environmental policy elements

EMS MANUAL DEVELOPMENT

Written documentation is an important aspect of the EMS and helps to communicate expectations to employees, demonstrate commitment and facilitate management and control of the operation. The CCMUA EMS Manual was developed in conformance with the 12 elements identified in the NEIC EMS guidelines. The EMS Manual was completed in September 2000.

The CCMUA EMS Manual was developed to help formalize the structure of the EMS and provide a framework to ensure continuation of the program even if its architects should depart. The manual provides an overview of the EMS organizational structure, planning activities, responsibilities, procedures and resources for implementing, reviewing, and maintaining the aims of the CCMUA's environmental policy.

SUSTAINED IMPLEMENTATION

One important goal of the CCMUA's EMS program was to improve communication throughout the organization. Specifically, the EMS implementation team was charged with the responsibility of ensuring that the environmental policy goals of CCMUA management were conveyed through the mid-level supervisors to the line workers who operate and maintain the plant facilities. Conversely, the EMS implementation team is also responsible for making sure that critical path data is conveyed from the plant operators through the mid-level supervisors and up to the executive management. In this way, all levels of management are kept continually updated with respect to the process parameters that are deemed critical to the plant's performance.

The EMS implementation team meets on a regular basis to discuss key issues and to make sure that all levels of management have "their finger on the pulse" concerning plant operations. Finally, the EMS implementation team conducts brainstorming sessions to identify and address opportunities for operational and environmental improvement.

KEY COMPONENTS OF THE EMS

ENVIRONMENTAL POLICY

The cornerstone of the CCMUA's EMS is its environmental policy. This written statement addresses the organization's public commitment to environmental compliance, continual improvement, and general environmental performance, and reads as follows:

The mission of the Camden County Municipal Utilities Authority employees is to be committed to our customers, the public health, and quality wastewater management. The Camden County Municipal Utilities Authority's Environmental Policy supports the CCMUA's mission through a proactive commitment to:

- § Compliance with applicable federal, state and local environmental permits, regulations, laws, and statutes.**
- § Continual improvement of:**
 - N Pollution prevention activities**
 - N Environmental performance**
- § Communicating environmental matters to all employees, site visitors, and neighbors.**

To conform to the NEIC EMS guideline requirements that environmental policy should be communicated to all employees and available to other interested stakeholders, such as neighbors, suppliers and vendors, and regulatory agency personnel, each CCMUA employee received a copy of the environmental policy and it is posted on the CCMUA Web site (<http://www.ccmua.org>) for reference.

REGULAR ASSESSMENT AND REPORTING

The CCMUA EMS calls for the EMS implementation team to meet regularly to identify opportunities for improving environmental performance. Then, the EMS program manager provides a monthly report to the CCMUA Board of Commissioners that addresses environmental performance. This ensures that the Board of Commissioners' environmental performance goals for the company are disseminated throughout the organization from top to bottom and that the Board is kept apprised concerning the extent to which these policies are being implemented.

The CCMUA EMS involves all staff implementing corrective actions on an ongoing basis to address problems identified during the course of normal operations. Corrective actions include immediate actions to stop the problem; interim actions put in place until permanent action can be implemented; remedial actions to address other affected areas; and preventive actions to prevent the problem from recurring. Continual observation and monitoring of wastewater treatment processes result in corresponding performance improvement.

The CCMUA EMS Manual also describes use of its Operations and Maintenance Department's computer system and scratch-pad to track work order status and specific communication protocols for sewage treatment plant operators on shift change. The process provides continual

communication and tracking of performance assessment over the three plant operational shifts. The EMS implementation team also evaluates on an ongoing basis the need for new or modified standard operating procedures for each new process or equipment change made.

ENVIRONMENTAL INCIDENT AND NONCOMPLIANCE INVESTIGATIONS

The CCMUA EMS Manual identifies reporting requirements and procedures for environmental incidences and compliance issues. The EMS implementation team investigates emergency condition occurrences and potential violations of environmental regulation and permit requirements and reports findings to the EMS Program Manager. The EMS implementation team is responsible for identification of the root cause(s) of the potential violation and for developing a corrective action plan that includes actions to prevent recurrence of the potential violation.

The EMS implementation team conducts regular assessments of the effectiveness of each corrective action put in place as a means of continual performance improvement. The EMS implementation team recommends actions to be taken to modify the corrective actions as needed and then checks these actions in a continual plan-do-check-act cycle. The corrective actions are reviewed on a regular basis until such time that the corrective action is determined to meet its intended purpose. The EMS implementation team also uses trend analyses to assess operational data and to assess the effectiveness of corrective actions implemented.

ENVIRONMENTAL PLANNING AND ORGANIZATIONAL DECISION MAKING

The EMS implementation team and also provide input for the annual capital budgeting process, and the EMS program manager includes capital budget and planning issues on the agenda for the EMS implementation team meetings that take place during the budget planning period. The EMS program manager is also responsible to ensure that the input of the EMS implementation team is integrated at the earliest stage, and throughout all planning phases for all planning design, construction, and operations projects.

POLLUTION PREVENTION PROGRAM

The EMS Manual describes CCMUA's internal program for preventing, reducing, recycling, reusing and minimizing waste and emission, including their Industrial Pretreatment Program (IPP), odor control systems improvements, and the sludge management program. The Delaware No. 1 WPCF is a pollution prevention facility and as such efforts are made to optimize plant performance and prevent pollution. CCMUA employees are encouraged to identify ways to minimize waste emissions and to look for ways to improve operations. These opportunities for improvement are discussed in the daily operations and maintenance staff meetings, as well as at the regular EMS implementation team meetings.

RESULTS OF EMS IMPLEMENTATION

As stated above, the CCMUA has three fundamental goals that are critical to the success of its operation:

- 4) Optimization of Water Quality Performance
- 5) Optimization of Air Quality Performance
- 6) Cost Minimization

Implementation of the CCMUA's Environmental Management System resulted in significant improvement in all three areas.

OPTIMIZATION OF WATER QUALITY PERFORMANCE

When the CCMUA began its internal improvement campaign, it struggled to meet its monthly discharge permit limits of 30 parts per million (ppm) of suspended solids (TSS) and biochemical oxygen demand (BOD). The plant averaged about 25 ppm even though it was an 80 MGD capacity plant that was only receiving about 55-60 MGD. In response, the CCMUA EMS implementation team adopted new policy goals. Instead of striving to merely meet the permit limits, the CCMUA strove to optimize the quality of its effluent. New sludge thickening and dewatering equipment was also installed to improve the plant's sludge capture capabilities. As a result, although influent flows were roughly constant, sludge removal increased by over 30%, from 46,000 tons removed in 1999 to over 60,000 tons in 2004. Effluent quality improved correspondingly. BOD and TSS levels averaged 17 ppm in 2004, a significant improvement over the 25 ppm average in 1999.

In addition, the CCMUA had had 24 wet weather bypasses in 1999. It has had two wet weather bypasses, total, in 2000, 2001, 2002, 2003, 2004 and 2005. In short, the EMS was directly responsible for a complete turnaround in the CCMUA's corporate philosophy toward optimizing its water quality performance.

OPTIMIZATION OF AIR QUALITY PERFORMANCE

In 1997/1998, the CCMUA was cited on 16 separate occasions by the New Jersey Department of Environmental Protection for odor violations. As mentioned above, the CCMUA's 80 MGD treatment plant is in the midst of an urban, densely populated urban neighborhood.

In response, the EMS Team adopted a zero tolerance policy toward odor emissions. Plant operators were directed to check odor control systems on a regular basis, close all doors at all times, tarp sludge laden trucks and perform repairs with a high potential for odors (i.e., lowering sedimentation tanks) during the late evening and early morning hours. New supervisors were hired to make sure that there was a responsible supervisor on all three operating shifts, seven days a week.

In addition, the CCMUA invested over \$5 million in new odor control equipment at the plant headworks and scum concentration facilities, the areas with the biggest potential for odors.

Finally, a 24-hour odor hotline was setup, providing the neighboring community with 24-hour telephone access for reporting odor concerns. As a result, the CCMUA has had only two odor violations in the past seven years, after receiving 16 violations in a 14-month period in 1997 and 1998.

In addition, in order to compensate for years of suboptimal odor control performance, the CCMUA began a policy of assisting the neighborhood in any way it could. This included donating adjacent land it owned for creation of a neighborhood park, planting additional trees, helping to establish an environmental wellness center and helping the neighborhood to reduce truck traffic by sponsoring an ordinance to eliminate truck traffic on residential streets.

As a result of all this, the CCMUA is no longer viewed by the neighborhood as an enemy, but rather a caring member of the community.

COST MINIMIZATION

When the CCMUA began its internal improvement program in 1996, it had an annual operations and maintenance budget of \$21.2 million. By 2000, it had been reduced to \$16 million. Key cost saving initiatives included:

- 4) reduction of employees from 229 to 150
- 5) closing of the highly inefficient sludge composting facility and replacement with lower cost sludge disposal options
- 4) switching large electric motors from electricity to natural gas
- 5) reduction of outsourced maintenance via selective hiring of skilled in-house maintenance workers
- 4) reduction of chemical costs via increased enforcement of Sewer Use Ordinance (influent levels of hydrogen sulfide were reduced, allowing for corresponding reductions in corrosion fighting chemicals)

In addition, the CCMUA initiated revenue enhancing projects as well, including:

- B increased revenue collections via hiring utility investigators to locate previously unreported accounts
 - comparing sewer charges with water company records to capture additional revenue from previously under reported accounts
- B utilization of spare treatment capacity via institution of an outside septage receiving program

As a result of these cost saving and revenue enhancing projects, the CCMUA has not only been able to hold its rate for the past ten years (1996-2005), but it has actually reduced its rate three times during that ten-year period.

CONCLUSION

Although the CCMUA ultimately rejected the privatization proposal, the privatization process was actually extremely successful in that it showed the CCMUA that better operational and cost performance was possible. Moreover, it provided the incentive that spurred the CCMUA to think and act like a private sector business that must optimize its performance for the environment, its ratepayers and its neighbors.

Implementation of the environmental management system was also successful in that it gave the CCMUA the managerial tools that it needed to improve its water quality, air quality and cost performance, and to sustain that improvement on a continual, ongoing basis.