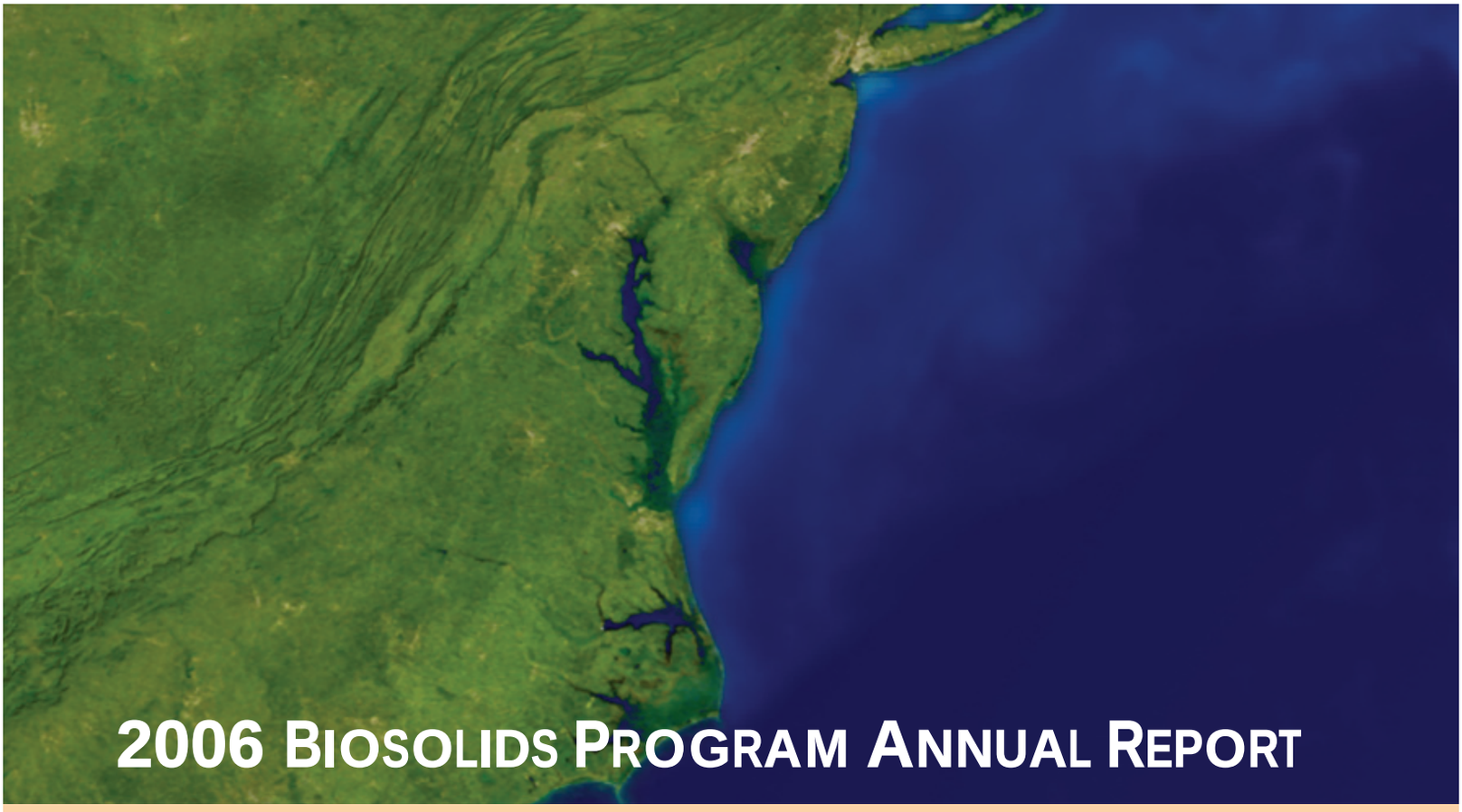

2006 BIOSOLIDS PROGRAM ANNUAL REPORT

THE MISSION of the District of Columbia Water and Sewer Authority biosolids management program is to provide reliable, diversified, flexible, sustainable, environmentally sound, publicly acceptable, and cost-effective management of biosolids produced by the Blue Plains Advanced Wastewater Treatment Plant while helping preserve agriculture and protect the Chesapeake Bay.

District of Columbia Water and Sewer Authority

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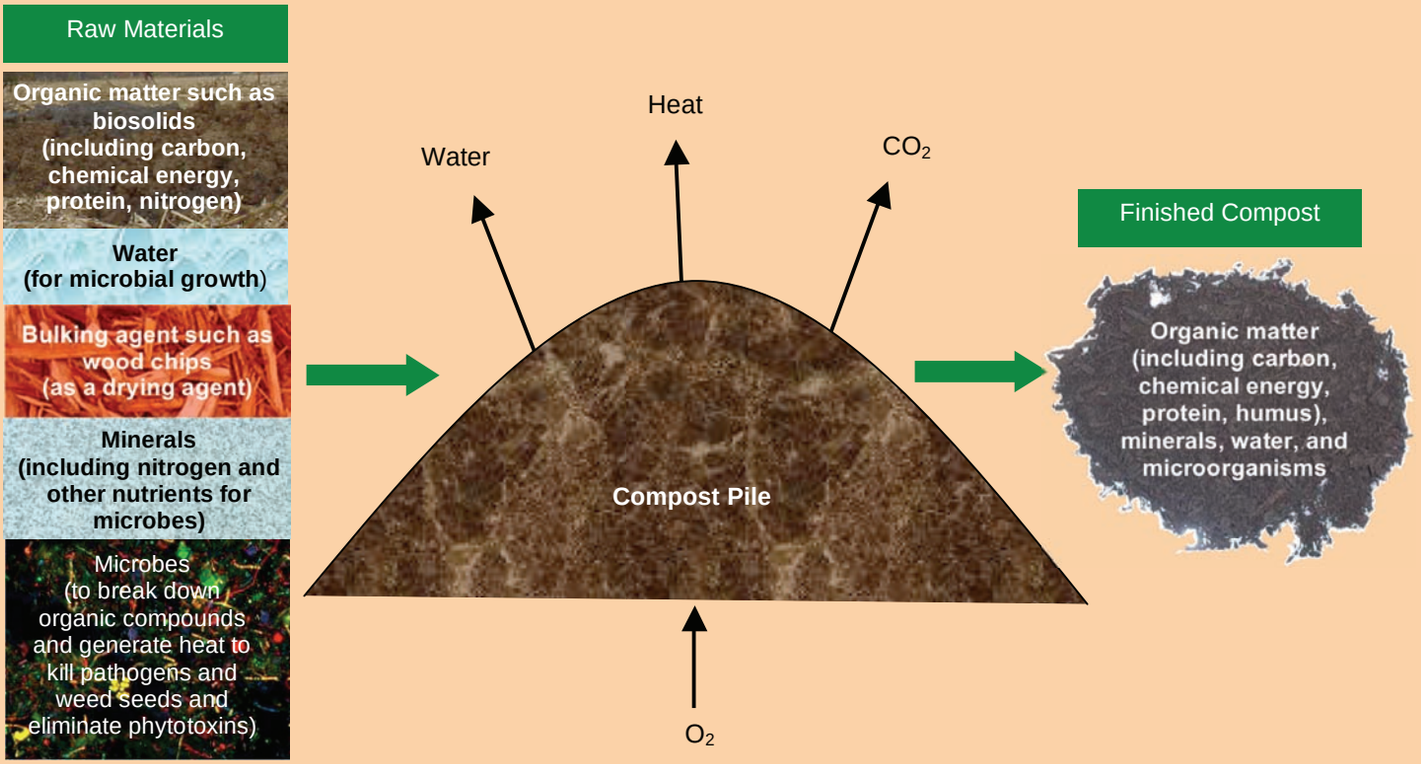
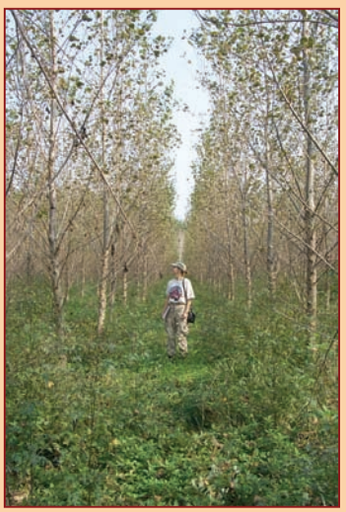
March 2007



Composting is a natural biological process where biodegradable organic material such as biosolids is broken down in a controlled manner by the action of microorganisms. DC WASA will be pilot-testing in-vessel composting using biosolids and wood chips. Above is a typical composting process.



A Maryland poplar farm owned by ERCO uses DC WASA biosolids as fertilizer for trees that can produce many useful products.

LIFECYCLE BIOSOLIDS ADMINISTRATION

Background

The DC WASA biosolids program focuses on five outcomes:

- **Consistent product quality**
- **Regulatory compliance**
- **Public acceptance**
- **Environmental performance**
- **Continual improvement**

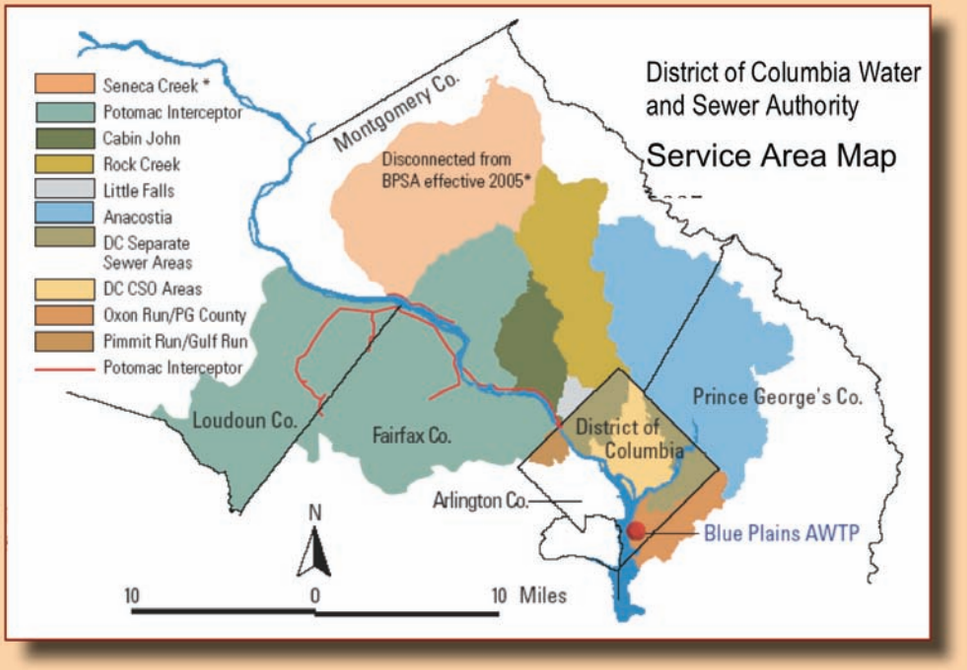
In 1996, the District of Columbia Water and Sewer Authority (DC WASA) faced the daunting task of upgrading an enormous and complex facility, posing huge challenges for its biosolids program. The agency had just assumed management of the Blue Plains Advanced Wastewater Treatment Plant from the Washington, DC government. The facility treated about 360,000 wet tons per year of biosolids (1998 figures); 84 percent was lime-stabilized and land-applied, and the rest was anaerobically digested and mostly co-incinerated. Much of the plant equipment was old, in disrepair, and often out of service. Composting had been discontinued after the composting facility was shut down, creating a challenge for disposing of those 45,000 wet tons per year (wtpy).

In 1999 DC WASA adopted a 20-year master facilities plan and a 10-year, $1.6 billion capital improvement plan. As part of these plans, in 2001 it launched an integrated, three-phase biosolids management program focusing on end-use options for biosolids, including odor control.

Biosolids are now 100% lime-stabilized and nearly 100% recycled through land application. Belt filters were removed and the 14 dewatering centrifuges, many new, became fully enclosed and vented to scrubbers. Numerous other equipment improvements were made. The biosolids team implemented a formal process for identifying root causes of situations, including of biosolids odors. DC WASA biosolids now consistently meet Class A standards for fecal coliform (a harmless indicator organism) and are of significantly higher quality than Class B all around.

Today, the agency serves more than two million Washington DC metro area customers. It has capacity to treat 370 million gallons of wastewater a day and a peak wet-weather capacity to treat 1.076 billion gallons a day. Each year, DC WASA generates more than 400,000 wet tons of biosolids and recycles them by applying them to more than 20,000 acres of agricultural land. About 40 percent of its product comes from the Washington Suburban Sanitary Commission (WSSC), which serves customers in Montgomery and Prince George's Counties, Maryland. As the largest advanced wastewater treatment facility in the world, DC WASA continues to be a leader in environmental stewardship, with continual upgrades responding to community needs.

This annual report provides an update on the biosolids division's accomplishments between January and December 2006.



Accomplishments

In 2001, DC WASA seized on the chance to participate in the voluntary National Biosolids Partnership (NBP) Environmental Management System (EMS) program and was certified to the NBP EMS standard in October 2004. Over the summer of 2006, the biosolids program went through a comprehensive internal audit in preparation for an outside audit. In October 2006, it gained third-party verification to the NBP program.

Through the EMS, regular Biosolids Workgroup meetings bring stakeholders together to establish goals and milestones, action items, and a tracking system for these activities.

DC WASA identifies operational, management, and environmental impact areas that need to be controlled – and then takes steps to do so.

A key indicator of improvements is the number of offsite significant incidents reported. Between 2005 and 2006, total reported incidents went down by 16 percent and reported odor incidents dropped by 63 percent. Incidents that are considered significant and must be reported include, but are not limited to, the following:

- Biosolids spills
- Lime or other chemical spills
- Any incident that has potential to cause personal injury, disease or death, or property damage
- Stakeholder complaints, including odor and health-related complaints

A summary comparison between incidents in 2005 and 2006 is given below:

Year	Total Incidents	Odor-Related Incidents
2005	31	19
2006	26	7

Note: These data do not include routine request for information, site visits from stakeholders, or routine visits from state and local officials.

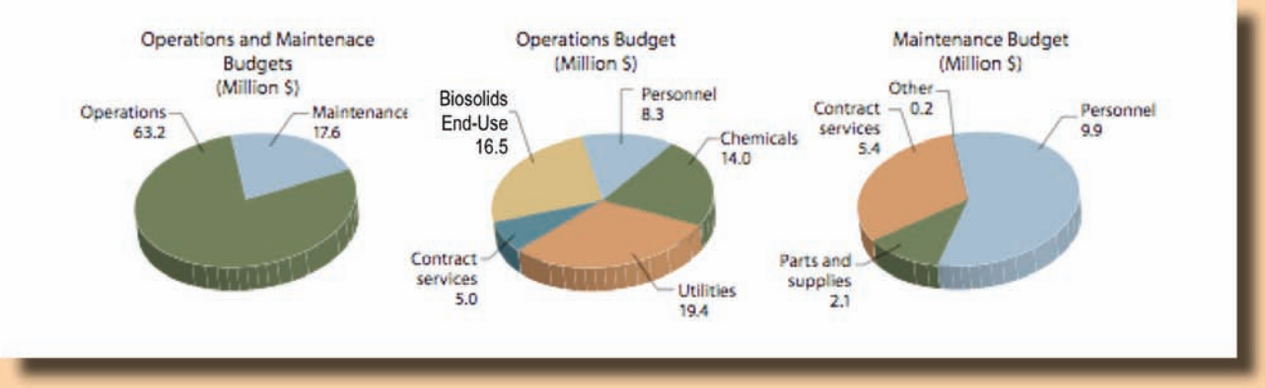
Between 2004 and 2006, the biosolids program could boast improvements in inspections, training, monitoring progress toward goals, operational processes, research activities, and public outreach. The challenge now is to move beyond the "low-hanging fruit" to even more substantive leadership. Preparing for an uncertain future may be the greatest challenge of all, and this demands that agencies move well beyond basic biosolids management.

Biosolids Division Goals and Milestones

Each year, DC WASA establishes goals and milestones for its biosolids program. Sections below contain reports on the outcomes of specific 2006 goals.

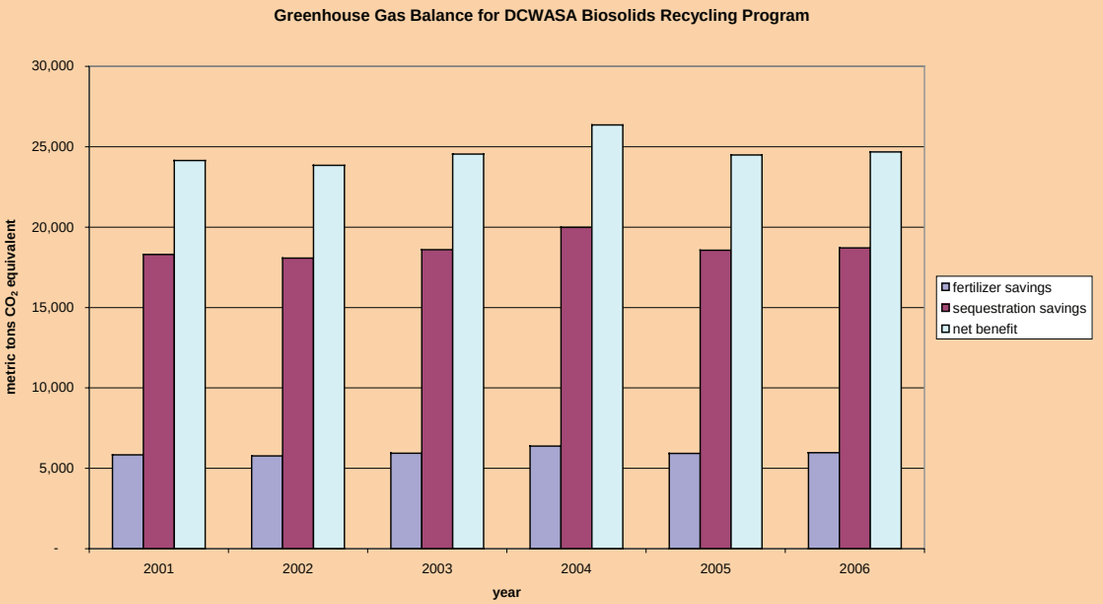
One major objective DC WASA embraces is helping the entire wastewater treatment industry work together to address common challenges and achieve common purposes. It works closely with area utilities, but also is an active member of regional, state, and national organizations. It has a cutting-edge, internationally collaborative research program as well.

Budget



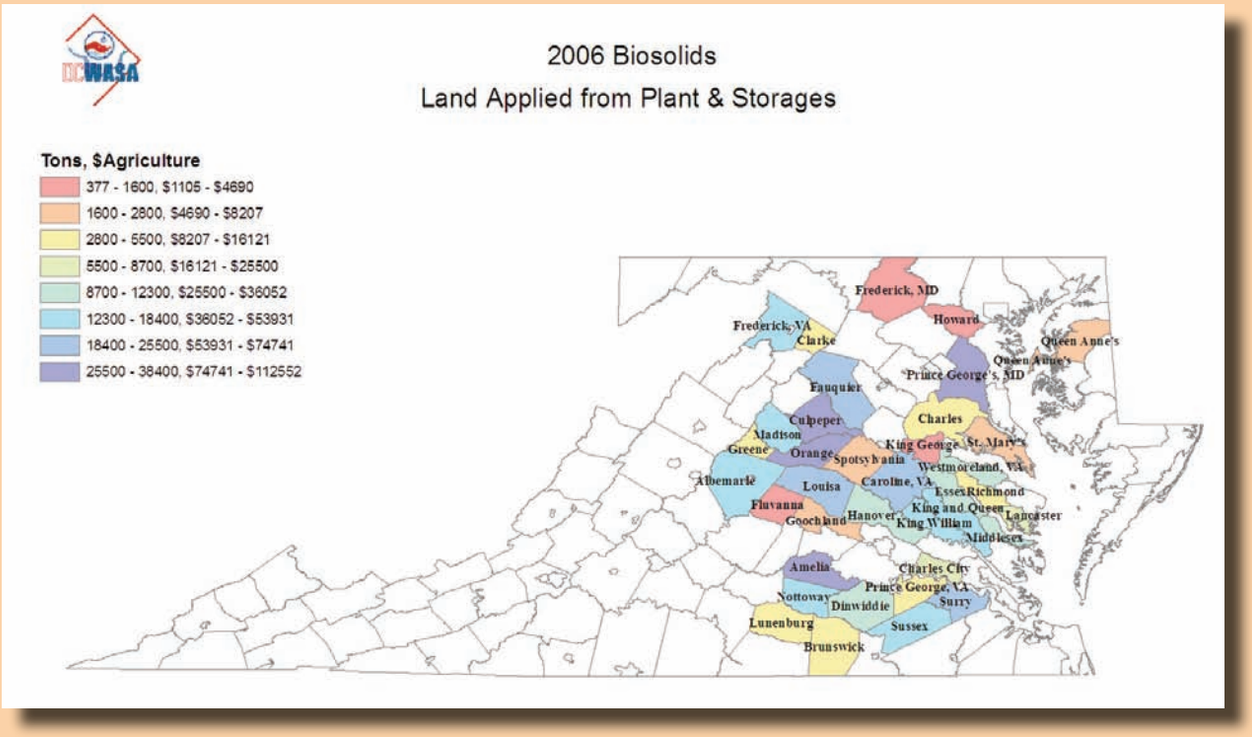
2006 Biosolids End-Use

Another objective is focusing on cradle-to-cradle management of its processes, including increased environmental sustainability. For example, from data it has gathered, it now knows the total dollars saved in nitrogen and lime provided by biosolids to farmers that they otherwise would have had to purchase in organic fertilizers; in 2006: $1,296,000.



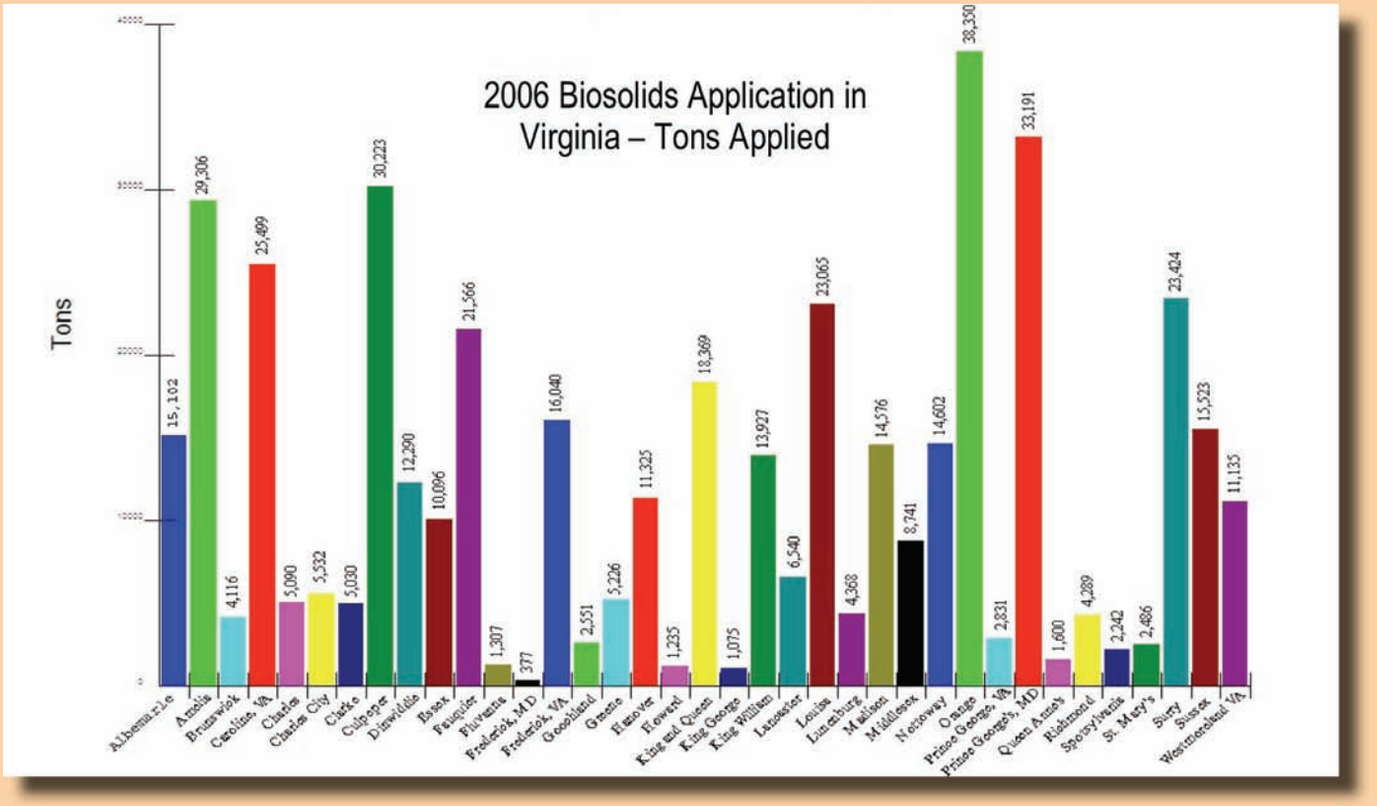
DC WASA annually tracks the greenhouse gas reductions resulting from its biosolids recycling program. The graph below shows the net benefit from land-applying Blue Plains biosolids over the past 10 years. In contrast, nearly 450,000 metric tons of CO_2 would have been released in 2006 had the biosolids been landfilled that year.

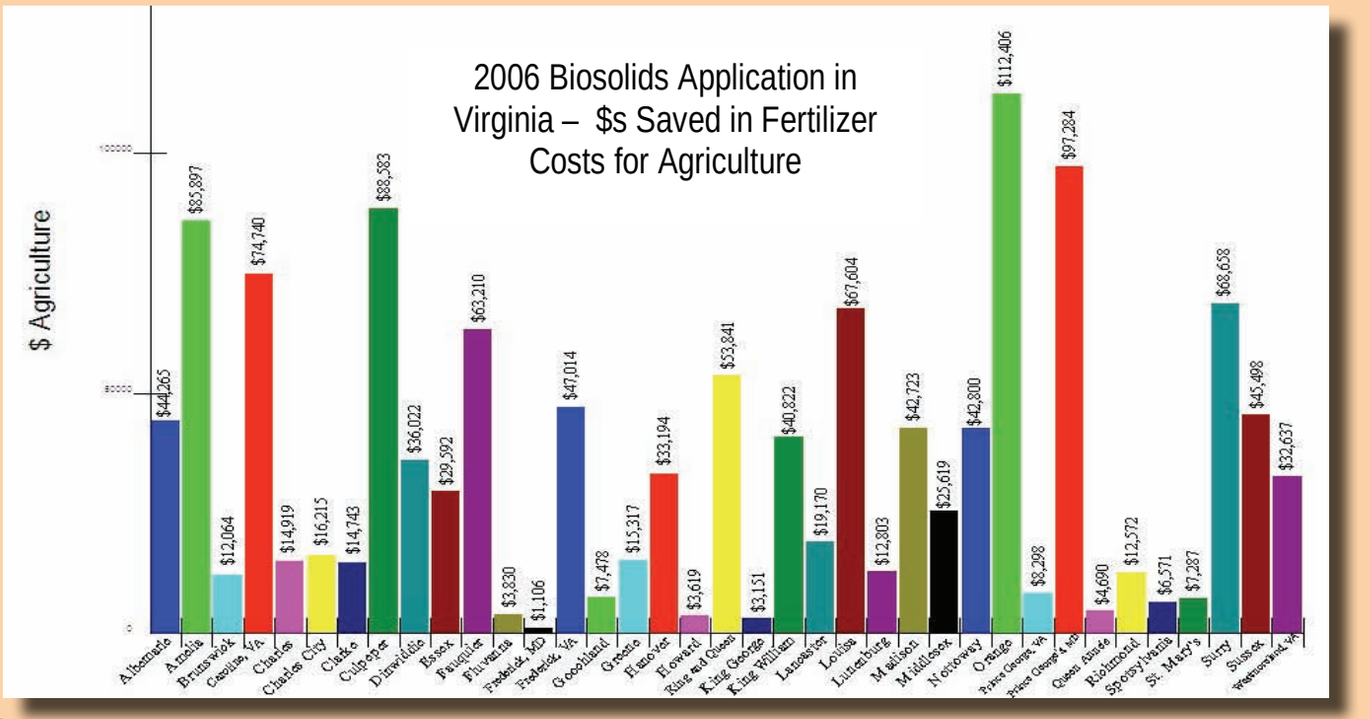
Each month, DC WASA reports on biosolids land application by county, including quantities generated and end-use distribution by state. To the right is information for 2006.



Virginia Land Application

About 90 percent of DC WASA biosolids is land-applied in Virginia. The following charts show the tons applied per county (top), and the dollars the biosolids were worth in terms of fertilizer costs (bottom).





REGULATORY COMPLIANCE

Regulatory Monitoring

Identifying existing legal and other requirements that impact the various aspects of DC WASA's biosolids program is extremely important. When new or revised regulations are proposed, DC WASA identifies, tracks, and assesses the potential effects on the biosolids program, and then incorporates any changes to its program that are needed.

Biosolids quality is subject to regulation at the federal and state levels, and in some cases through local ordinances. Federal standards for the use or disposal of sewage sludge are codified at 40 CFR Part 503, *Criteria for the Use and Disposal of Sewage Sludge*. In addition, the biosolids from Blue Plains AWTP are subject to the requirements of Maryland and Virginia when they are managed within those jurisdictions. Specific requirements for other states would need to be satisfied should DC WASA apply or distribute biosolids in those jurisdictions.

A summary of legal and other requirements is provided in *DC WASA Biosolids Division Summary of Legal and Other Requirements*.

2006 GOALS AND MILESTONES

1.1 Comply with all statutory and regulatory requirements (onsite and offsite operations).

- Achieve zero notices of permit violations related to management of biosolids.
- Submit annual Part 503 regulation compliance report on time.
- Prepare and file on time annual and monthly reports that are required by states in which Blue Plains biosolids are managed.
- Keep up with and record regulatory and legislative requirements and changes.

1.2 Comply with all local and state permitting and other requirements.

- Improve process of documenting records of monthly contacts with state regulators in Virginia and Maryland to stay abreast of permitting changes, new policies, and problem areas.

Effluent Parameter	EPA Permit Limit Mo/Avg *(mg/L)*	DC WASA Data 2006 Mo/Avg *(mg/L)* (change from 2005)
Carbonaceous biochemical oxygen demand (CBOD)	5.00	2.86
Total suspended solids (TSS)	7.00	1.00
Total phosphorous (TP)	0.18	0.08
Total nitrogen	7.5 (goal)	5.70
Ammonia nitrogen (NH-3N)		0.84
Summer (May 1-Oct 31)	4.20	
Winter 1 (Nov 1-Feb 14)	11.10	
Winter 2 (Feb 15-Apr 30)	12.80	
Dissolved oxygen (DO) minimum daily	5.00	7.68
Dissolved oxygen (DO) minimum instantaneous	4.00	6.53
Total chlorine residual	0.02	0
pH (minimum)	6.0	6.3
pH (maximum)	8.5	7.1
Fecal coliform (#/100 ml)	200.0	2.66
Biosolids Parameter	**EPA Permit Limit Mo/Avg *(mg/L)***	**DC WASA Data 2006 Mo/Avg *(mg/L)* (change from 2005)**
Fecal coliform (#/g – Class B)	2 million	<1,000
As (ppm)	41	2.1
Cd (ppm)	29	0.64
Cr (ppm)	No limit	25
Cu (ppm)	1,500	144
Pb (ppm)	300	27
Hg (ppm)	17	0.48
Mo (ppm)	No limit	7.3
Ni (ppm)	420	10.9
Se (ppm)	100	1.79
Zn (ppm)	2,800	325

Regulatory Compliance

DC WASA met all of its biosolids goals related to regulations and permits and was in compliance with or significantly exceeded all EPA permit standards and requirements for biosolids quality. DC WASA has received no biosolids permit violations since EPA regulations were published. In 2006, it improved or remained the same in all its effluent and biosolids parameters from the year before. Notably, fecal coliforms in effluent dropped from 9.51 to 2.66 per 100 ml, well below the federal requirement of 200 per 100 ml. In biosolids, fecal coliforms were well below a thousand per gram, again meeting Class A standards. The chart to the left summarizes the monthly averages for regulated parameters.

Legislative, Legal, and Regulatory Updates

Virginia

DC WASA staff, with help from the Metropolitan Washington Council of Governments (COG) and the Virginia Association of Municipal Wastewater Agencies (VAMWA) Biosolids Workgroup, track legislation that could affect the biosolids regulatory program in Virginia, where the vast majority of Blue Plains' biosolids is applied. They provide input into the legislative process and inform members of the Blue Plains Technical and Regional committees, which include representatives of Fairfax County, Va., of these activities.

Four bills regarding the state's biosolids program were introduced in the Virginia General Assembly in 2006. Three of these were not approved, including two (HB 688 and HB 690) that would have resulted in severe disruptions to the program. A fourth (HB 1134), approved with amendments, requires the agency responsible for administering the biosolids land application program, to increase permit fees to pay for an additional full-time position. The increases are expected to cost land appliers an additional $100,000 a year, about half of which eventually may be paid by DC WASA and WSSC if their contractors pass on these. One bill not approved (HJR 101) but held over for 2007 would have charged several state agencies with conducting a study of the environmental impacts of biosolids land application.

In the regulatory arena, DC WASA and COG staff participated on the state's Biosolids Use Regulations Advisory Committee (BURAC). Although a number of regulatory changes were pending throughout the year, none was officially approved. One area of particular concern was storage, though the state did not move forward with proposed modifications to the on-farm storage section in the biosolids use regulations.

By the end of the year, it was becoming clear that the Virginia General Assembly would consider legislation to transfer oversight of the biosolids land application program from the Virginia Department of Health to the Department of Environmental Quality. DC WASA staff planned to monitor the legislation and provide input.

DC WASA monitored a lawsuit in Sussex and Surry Counties affecting one of its land application contractors, and several ordinances, including one in Rappahannock County that could set precedents for biosolids use.

Maryland

In 2006, the Maryland Department of Environment (MDE) began updating its biosolids regulations and revived a task force of wastewater plant representatives active during previous rounds of regulatory change. Both DC WASA and WSSC staff participated on the MDE biosolids task force when it began meeting in October. That effort was expected to continue into 2007.

DC WASA Biosolids Workgroup members noted that the MDE task force meeting would represent an opportunity to raise concerns regarding program fees, lack of flexibility, and other issues with MDE's management of biosolids, which have helped create an imbalance between the amount of biosolids applied in Maryland and Virginia, and could require more expensive and less environmentally sustainable end-use options. One MDE proposal would significantly increase permit and generator fees charged to in-state and out-of-state generators who apply biosolids in the state. WSSC staff submitted comments on the proposal and Biosolids Workgroup members agreed to encourage other generators to submit comments as well.

About eight percent of biosolids processed at the Blue Plains plant were land-applied in Maryland in 2006, and a further 2.8 percent are used to amend soil for a hybrid poplar/deep-row trench system at the ERCO site in Prince George's County. The company's manager noted that its experimental-use permit from the MDE was still under review at the end of the year, after several years of successful farming. He said the company would drill some small test wells at the site to address MDE's interest in movement of nitrate.

QUALITY MANAGEMENT

Monitoring and Measurement

Critical control points are those biosolids management activities that are under the direct control or influence of DC WASA and that have the potential, if not managed effectively, to create significant changes to the quality of its biosolids and could create negative environmental impacts. Critical control points include activities that can affect the quality of biosolids, how biosolids are managed, or how the DC WASA biosolids program is viewed by the general public and regulators.

At least once a year, the biosolids division manager and the Biosolids Workgroup review DC WASA's biosolids value chain and identify or re-verify critical control points. Operational controls for critical control points also are identified, and include standard procedures, work practices, or other activities to ensure that critical control points are effectively managed.

Monitoring and measurement tools are used throughout the entire DC WASA biosolids value chain. The results of monitoring and measurement activities are assessed against legal and other requirements to verify compliance and to measure performance. These results also are assessed against biosolids program goals and milestones to evaluate conformance and ensure continual improvement. Monitoring and measurement parameters include legal, laboratory, and biosolids management process records.

Through the monitoring and measurement process, potential problem areas are flagged and corrective and preventive actions are identified. In addition to monitoring the degree of stabilization and quantities and quality of biosolids as specified in federal and state regulations, operational control of critical control points must be monitored and measured as specified by biosolids management program requirements.

Routine monitoring and measurement activities include keeping operations logs, inspection logs, and checklists designed to verify that procedures are being followed, such as truck loading weigh scale tickets, MES inspection reports, and biosolids quality laboratory analytical reports.

Training, inspections, audits, and contractor oversight are key elements in ensuring that these activities are undertaken and that stakeholders understand the roles they play in a high-quality biosolids management program.

2006 GOALS AND MILESTONES

2.1 Incorporate new technology and other improvements into operations.

- Full digestion, per the *Solids Handling Facility Plan.*
- Implement on-line access of inspection database.
- Reconcile tonnage and distribution databases so there are close to zero discrepancies in monthly reports.
- Explore use of bar codes for inspection data.

2.2 Provide and improve upon training.

- Implement a training tracking system.
- Provide opportunities for and achieve 100% attendance of WASA biosolids staff in educational programs, such as seminars or conferences.
- Provide at least two in-house training sessions for field inspectors on topics such as 503 Rule, incident reporting, EMS procedures, etc.
- Provide at least two external training opportunities for each field inspector on topics such as nutrient management, biosolids management, business writing, etc.
- Make WASA/MES inspector training activities available to local monitors and explore ways to get monitors to attend.
- Top management is fully aware of biosolids program objectives and targets.
- Create and disseminate biosolids information and incident and procedure brochure for truck drivers.

2.3 Improve inspections and audits.

- Conduct a minimum of six field visits each year by biosolids program staff to ensure proper procedures are being used in the field by contractors.
- Conduct interim audit of the EMS program.
- Establish and implement QC auditing procedures to reduce data errors in inspection database. Reduce errors to zero/month by end of goal period.

2.4 Improve oversight of contractors.

- Evaluate current contracts and make changes for next contract cycle based on biosolids program and EMS objectives and targets.

Anaerobic Digestion

In early 2006, DC WASA decided to delay design and construction of planned anaerobic digesters because of rising costs and contracting issues. Staff then reassessed operational and capital needs in the wake of the

decision. By the end of 2006, anaerobic digesters remained on the table, but other end-use options were being revisited. The plant faced a number of trade-offs between the cost of building digesters and the costs, both direct and indirect, of continuing to process 1,200 to 1,300 wet tons of lime-stabilized biosolids a day. Ramifications included the need to fund liming system improvements, the need to maintain crane operators on a longer-term basis and keep the storage bunkers in operation, and the need to maintain efforts to address public concerns about the land application program. DC WASA began a new engineering design project to examine and potentially redesign operations beginning with post-lime conveyance through truck loading.

The agency's biosolids management program, which consistently met or exceeded standards for Class B biosolids, and even some parameters for Class A biosolids in 2006, had been focusing on diversity of end-use options for just this sort of contingency. The Biosolids Workgroup renewed efforts to explore additional sustainable uses than those already in the works.

Class A anaerobic digestion remained an option because of its many proven advantages. One of them is that anaerobically digested material can produce biogas for electrical or thermodynamic energy – supplying as much as one third of Blue Plains' energy requirements. Another is that it can significantly reduce biosolids volume, thereby reducing truck hauling costs and the need for land to apply it on. In addition, long-term operations and maintenance costs can be dramatically less than for equipment used in other types of treatment. While egg-shaped digesters were the original configuration, other types of digesters were to be explored.

Training

In 2006, DC WASA hosted several of the local biosolids monitors from Virginia counties at Blue Plains for a tour of the facility. The tour was designed to give the monitors the opportunity to learn about control measures in place at Blue Plains and to answer questions from the public.

Maryland Environmental Service is contracted to DC WASA to provide field inspections at biosolids applications sites. In December, MES's training session for field inspectors drew 90 percent of its inspection staff, a record. Overall, MES inspectors attended a total of 62 training courses in 2006, which met the goal of having each inspector attend at least four training courses during the year.

Routine training and certification was conducted for all operators who were scheduled to take it.

In addition to this formal training, the biosolids division manager attended numerous meetings with staff, interested parties, and colleagues to explain the DC WASA biosolids management program, provide information of particular importance to the audiences involved, and address questions. An EMS awareness training program for employees was being developed for implementation in 2007.

Equipment and Processes

Throughout 2006, DC WASA continued investigating ways to improve its existing equipment and processes by using new technology, advancing cooperation among agency departments, and keenly monitoring and measuring operational controls. Negative incidents were avoided, staff explored root causes, and several new tools and improvements were added to biosolids program management.

Plant processes were better documented and good practices were more institutionalized in 2006 than they were in 2004. In addition, redundancies of 30 to 100 percent were built into most processes, giving operators more margin for error and upset.

Grit Removal

During the year, there were discrepancies in the weight of loads of grit leaving the plant and weights recorded at the landfill where the grit is delivered. The Biosolids Workgroup suggested that the weight of fuel (full tanks at the plant and almost empty at the landfill) could account for much of the discrepancy and it was to be investigated. In addition, the grit hauling system was planned to be added to the new automated ticketing system at the weight scales.

Dewatering

DC WASA operated with just two full biosolids dewatering trains in 2006, including centrifuges, conveyors and lime mixers, because of problems with the post-liming conveyors. Although the plant can meet its capacity needs with two trains, it was considered to be inadequate for the long-term. The problem with the conveyors reflected a continuing issue of meeting maintenance goals under current procurement policies. The Biosolids Workgroup invited someone from the Maintenance Division to attend its meetings on a regular basis to create a team approach to resolving the issue.

To minimize odor complaints, DC-WASA began implementing a system to check odors of sludge after centrifuge dewatering and before liming. Various devices were used for measuring and reporting concentrations of reduced sulfur compounds in real time to see which one worked best. Because liming can mask odors that reassert themselves in the field, this system was expected to pick up problems not being detected. Advance knowledge of potential bad odors would allow contractors to better manage material in the field.

In June, staff noted a spike in odors when sludge was backed up in the conveyors going to the centrifuges. They then installed reduced-sulfur monitoring devices in the conveyor system to provide on-line monitoring data before liming.

Thickenening

In 2006, biosolids quality was affected several times by an increased sludge blanket depth in the dissolved air flotation thickeners. The same phenomenon occurred in the spring of 2004, when it led to lower-solids biosolids and hence higher costs for a two-to-three month period. The situation appeared to be temporary but performance parameters were not reached, so the Biosolids Workgoup discussed the link between sludge blanket depths and odor.

Odor research done at the plant had established clear correlations of increased odors with increased sludge blankets. One theory for the odor correlation was that it occurred when the microbes in the secondary process became older than the optimum age range for the advanced waste system employed by the plant. Plant engineers established optimum age ranges for the microbes used in various types of secondary processes.

Fully covered gravity thickener tanks (top) require minimal operator attention. Fully enclosed centrifuges (bottom) vented to odor control scrubbers contain biosolids dewatering odors.

Toward the end of the year, there were problems with the gravity thickeners producing output solids at about two percent rather than the goal of five to six percent. One reason may have been that many of the scum screens were out of operation. Another that the thickeners had been plagued by coagulated material that had not settled (floc), reflecting an increase in the dose of ferric chloride applied in the primary settling tanks from 3-to-4 mg/l to 7-to-8 mg/l. Operators experimented with different polymers and other chemicals and there were indications that conditions were improving. By December, output solids reached two to three percent.

Another issue was ongoing breakdowns in the conveyor system for limed biosolids due to a series of equipment failures. These breakdowns typically resulted in delays of six to 10 hours and led, in turn, to a back-up of sludge and an increase in sludge blanket depth in the secondary tanks. This situation had implications not just for the solids operation, but could negatively affect effluent quality. For this reason, DC WASA staff developed a contingency plan to bypass the liming system and store raw biosolids in a bunker. The hauling contract allowed for at least 12 loads of such material a day to a landfill. There were no liming system breakdowns in mid-December, which allowed a biosolids backlog to be moved within a few days.

Operations staff pursued two long-term fixes to the dewatering and thickening problems. One was to re-establish process controls on dewatering operations to meet process parameter goals. The other was to continue to build on joint efforts of operational and maintenance staff to keep equipment operating.

Lime Addition

Biosolids often leave the plant before the 24-hour results of onsite pH testing are available, which is good for minimizing potential odors in the field. MES inspectors do conduct spot checks for pH at the field application sites, but this is not done for every load. As a means of improving pH monitoring, DC WASA began work on adding a temperature-infrared alarm system to the lime operation that can signal when the initial pH level reaches 12.5 when lime is applied, giving it a margin of safety. However, because technical violations remain a possibility, other failsafe mechanisms would remain in place to ensure adequate performance of the lime dosing equipment and mixer.

Lime addition stabilizes sludge to create beneficial biosolids. At right is a Virginia limestone quarry.

By the end of the year, the Biosolids Division had received six calibrated temperature-infrared sensors and was in the process of implementing the monitoring system.

Production Fluctuations

Although month-to-month production totals may fluctuate, there was a positive long-term trend of declining overall production. One of the most likely reasons may have been the number of plant upgrades over recent years, particularly improvements to the primary and secondary settling tanks and gravity thickeners, which had stabilized solids content. Average solids percentage increased from 26 to 28 percent since February 2006.

In November, there was an unusual increase in tonnage that resulted in part from performance problems in dewatering operations. At least two reasons were cited: a number of centrifuges were off line and sludge blanket depths were allowed to increase, both because of maintenance issues. The Workgroup noted the need for better integrating operations and maintenance and resolved to continue inviting maintenance and procurement staff to meetings and establish more routine communications.

Crane Operation

As part of the continual improvement mission, crane operators were reminded to observe biosolids being loaded and to try to catch substandard material before it was sent to the field. On August 7, this effort paid off.

Operational problems on the weekend of August 5 and 6 resulted in finished biosolids to which lime was not added. When the material, which was stored in a bunker, was to be loaded onto trucks the next day, the crane operator noticed the odd color and smell and decided not to load until checking with a supervisor. The material ultimately was sent to a landfill, thereby avoiding field application of biosolids that did not meet regulatory standards.

The subsequent investigation revealed that the lime feeding system was not launched during a weekend start-up of the centrifuge dewatering process. In response, plant managers designated the dewatering start-up process as a "critical control point" under the biosolids EMS and began developing a standard procedure for the process. The incident indicated that dewatering staff could need further training, but it also showed that crane operators responded to instructions to stay alert to signs of possible problems.

Silos and Truck Loading

Over the year, DC WASA staff met with all contractors and haulers to discuss means of achieving more efficient biosolids loading and transport. Early mornings at the plant often saw trucks lined up and waiting for biosolids in an effort to avoid rush hour traffic leaving Washington DC.

The key to the successful strategy was better communication, fostered by an ongoing collaborative effort between the contractors and DC-WASA staff. After replies to a survey of truck haulers and plant staff determined that they all sought to have open discussions, the biosolids loading coordinator met with the contractors' dispatchers to equalize their loads as much as possible, using a model that accurately predicted loads per day through the end of the week. A more consistent loading plan enabled Synagro, the land application contractor, to reduce the number of truckers it used on a weekly basis.

For certain trucks, loading times reached the target of seven to nine minutes per truck from both silos. Loading windows were created that were both earlier and later than the peak loading periods, at which less-than-optimally sized tucks could be loaded. DC WASA staff also continued to explore means of allowing certified truckers to load themselves during non-staff hours at the facility, which would require a security plan that agency staff began to work on. Other solutions, such as nighttime propping at designated truck yards and GPS locators also were explored.

One problem with the model for predicting biosolids loads per day was that it did not work for weekends, when it consistently predicted far fewer loads than were actually produced. Some truckers were at the plant for up to five hours for one loading cycle. DC WASA's goal for 2007 was to reduce the maximum loading window to no more than one hour, alleviating the need for trucks to wait outside the plant to enter. Staff agreed to work on four-week projections of future daily biosolids allocations.

Several issues associated with the new silo unloading facility were resolved, but as of December DC WASA had not yet taken beneficial occupancy of the new loading silos pending more startup demonstrations scheduled for 2007. However, the silos were being used in manual mode.

The 80-hour operational demonstration of the new silos in September was shut down after four hours when biosolids overflowed the truck being loaded. As a result, the silo contractors went back to debugging the system. This had been the first time trucks were loaded from full silos, which increased the pressure and changed the physical characteristics of the biosolids. Trucks could be safely loaded in manual mode, which required two DC WASA staff to be present along with the truck driver. However, this did not meet the stated goal for the silos, which was to allow drivers to load their tucks themselves during off-peak hours. The

ongoing problems with the silo unloading facility would need to be taken into account as consultants tracked the consequences of the decision to postpone digester construction.

A new double-read electronic identification system that Blue Plains was planning to require all its haulers to install was expected address an issue related to potential misalignment of truck-trailer combinations.

Truck Scales

DC WASA began implementing a new automated ticketing system at the truck scales on August 2001. The agency now requires truckers to deploy electronic identification devices to allow staff to monitor tractor and trailer weights better. The system is capable of putting information onto bar codes that can then be read in the field by MES inspectors. A goal for 2007 was to explore use of bar coding, and use of a GPS tracking system.

Truck Hauling

As part of its training program, DC WASA began work on a handbook for truck haulers and dispatchers to be used by its contractors. With contractor input, a draft guide was developed by the end of the year that included emergency and spill procedures, a description of biosolids, information on the biosolids management program, and the roles and responsibilities of truckers. One trend that prompted the need for this handbook was that trucks occasionally had only two or three working turnbuckles to secure their tailgates. DC WASA, contractor rules, and transportation regulations require four working turnbuckles. This situation prompted a review of how truckers are reminded of their responsibilities and a handbook was deemed a good training tool.

Inspections

MES is contracted with DC WASA to conduct inspections of every land application site on the day biosolids are applied and to report on incidents that occur offsite and in the field. This activity is not required by regulations, but is undertaken by the agency to support an excellent biosolids program. MES met its goals, exceeding expectations by contributing immeasurably to biosolids management program improvement. For example, when the spring rush for land application approached, MES inspectors double-covered some sites to ensure that an inspector always attended at least part of a land application operation.

One or more MES representatives attended every Biosolids Workgroup meeting and provided detailed reports on incidents, including followup action and expert suggestions on root causes. Incidents were all reported well before the required time period. Throughout the year, MES met with state regulators and county officials to educate and inform them on biosolids monitoring activities. It also provided training to county monitors along with its own inspectors.

MES routinely uses olfactometers to gain objective data on biosolids odors at end-use sites. MES inspectors investigated seven odor complaints during 2006. Each was followed up with oflactometer readings.

Among its contributions to the biosolids program was a comprehensive relational database of land application locations and tonnages. These data allow the agency to track trends, predict sustainability, and communicate appropriately with stakeholders.

Inspectors test for pH levels and odors, among other activities, at each field application site.

Audit Results

In October 2006, DC WASA received its third-party NBP EMS verification after a successful interim audit that was conducted the week of September 4 to 8. A comprehensive internal audit conducted in August preceded the third-party audit.

There were a few nonconformances that were resolved within one month after the third-party audit findings and before the final verification was awarded. These were mainly the result of a mature program that needed to be further refined to meet continual improvement requirements.

The most significant non-conformance finding was that DC WASA lacked an adequate system for setting goals that related to the goal-setting process of the agency as a whole and the goals set by the Board of Directors. It also lacked a meaningful way to measure progress toward achieving its biosolids program goals. One particular weakness of the 2006 goals was that the agency appeared to lack control over contractors' activities as they related to its biosolids goals.

DC WASA staff addressed this finding by reviewing the agency's "strategic" goals and milestones and correlating the biosolids goals with them. Each goal was reviewed to ensure it had an associated measurable milestone and an action plan that could be assessed and implemented over a year. Discussions with contractors focused on aligning their activities with goals as well.

Among the minor nonconformance findings were that the agency did not schedule the required internal audit in a timely fashion; ERCO, a contractor that uses DC WASA biosolids to amend soil used in its silviculture operation, did not have its permit workbook immediately available on site; and staff training needed to be improved. All these issues were resolved. For example, the internal audit team developed a plan to do rolling audits so that the entire EMS would be covered over the course of each year. A training program was refined to ensure staff had refresher training, and the biosolids transportation handbook was undertaken.

The auditor also cited several nonconformance findings from its initial audit that it considered to be in need of further action. These included the need for more oversight over contractor outreach activities, the need for more communication between the biosolids division and the rest of plant operations and between the biosolids division and field activities, and the need to better document its emergency spill response plan. All these issues were addressed by taking action or by creating a goal for future action.

The third-party auditor finalized its report and forwarded a copy to DC WASA commending the agency for its progress. In conjunction with this, NBP awarded DC WASA its Platinum Tier 4 status in the program, signifying the highest level of commitment and achievement. NBP presented DC WASA with a plaque at the WEFTEC conference in Dallas in late October.

RELATIONS WITH INTERESTED PARTIES

Proactive Outreach

DC WASA has a well-managed and award-winning biosolids program. Public confidence in the quality of its biosolids remains high, and the agency has a robust approach to providing the public with meaningful opportunities to offer input in these processes. Contractors also play a formal role in DC WASA's communications efforts.

The Biosolids Division keeps records of input, inquiries, and requests for information about its biosolids operations and has a policy of responding as soon as possible. This information, along with trending analyses, is used during reviews to inform decisions related to goals and other activities.

One of the most important communication mechanisms is via the Biosolids Workgroup, which meets monthly and reports to the Blue Plains Regional Committee.

2006 GOALS AND MILESTONES

3.1 Foster open and effective communication among all program participants and interested parties.

- Improve process for receiving information on actionable incidents from contractors and local government officials.
- Conduct or assist with a minimum of six informational meetings/public hearings each year to receive input on the biosolids program from areas where Blue Plains biosolids are used.
- Implement joint public outreach efforts in concert with other biosolids generators in the region.
- Improve biosolids information available on website
- Develop a system to evaluate well discharge zones.

3.2 Engage in activities to keep abreast of and influence issues of public concern.

- Disseminate research reports to staff and the public.

The BPRC was set up under the Blue Plains Intermunicipal Agreement (IMA) as a means of implementing the IMA itself. The 12-member committee is appointed by the chief administrative officers and general managers of the participating IMA members, with two from each of the following DC area municipal jurisdictions or agencies: Washington DC; Fairfax County, VA; Prince George's County, MD; Montgomery County, MD; the Washington Suburban Sanitary Commission, MD; and DC WASA. It provides a forum for in-depth discussion of the technical, policy, and financial issues affecting its members. The BPRC routinely communicates to and may provide formal recommendations to the DC WASA Board of Directors and upper management, and provides overall guidance to the Biosolids Workgroup.

The following section illustrates the kinds of public outreach undertaken over the year.

Outreach and Input

- DC WASA has a history of working with members of the SAIF (Safe, Affordable, Investigated For all) water group and with Virginia Department of Health inspectors to increase well buffers on a case-by-case basis. In April, staff met SAIF in Lancaster County, VA. The group represents rural residents living with compromised, shallow wells for their drinking water supply. At the meeting, the group discussed developing a tool for use by local county monitors that could apply scientific principles (slope, soil type, field condition, etc.) in assessing whether a buffer needed increasing.
- After a report from the agency's land application contractor that sometimes more biosolids are being hauled on Fridays and Saturdays than on weekdays, the workgroup noted that, in addition to potentially higher costs for the contractor (because of overtime), this situation had the potential to cause more complaints from the public, who were more likely to be aware of biosolids activities on the weekend. This was one contributing factor in deciding to try to equalize daily hauling quantities by doing better at predicting upcoming production up to four weeks in advance.
- In May, staff attended a Biosolids Use Information Committee (BUIC) at the Virginia Farm Bureau (VFB) Building in Goochland County. The guest speaker, Dr. Erik Ervin, presented a talk entitled *Auxin-Boosted Biosolids Effects on Drought-Stressed Grass.* Dr. Ervin is an Associate Professor of Turfgrass Physiology at the Virginia Tech main campus in Blacksburg, and the research findings presented came from a project that DC WASA funded through the nutrient rebates in the biosolids reuse contracts. That month, members of

the Biosolids Workgroup also met with representatives of Alexandria Sewer Authority to discuss research and other topics of mutual interest.

- In August, members of the DC WASA staff attended the Virginia Agriculture Expo in Culpepper County, Virginia. The event was an opportunity to set up the DC WASA biosolids information booth and speak with farmers and regulators regarding biosolids recycling. Staff made contact with the director of the Virginia Soybean Growers Association regarding working together on biodiesel initiatives.
- Two incidents of slightly low pH readings on samples from trucks containing biosolids from another agency prompted a discussion of whether pH measurements of biosolids should be expected to change much once a maximum is reached. The experience at Blue Plains as well as research the agency conducted on pH dynamics indicated that maximum pH readings should not significantly decline for at least 30 and perhaps as long as 60 days post-liming. Therefore, low pH readings obtained in the field several hours or several days after liming are an indication of inadequate liming at the plant and potential regulatory violations. DC WASA policy calls for any low-pH loads to be returned to the plant or sent to a landfill.
- In discussing elements of his public outreach program, the president of the ERCO tree farm site in Prince George's County, MD reported that he had no nuisance complaints from neighbors at the site, in part because the trenching application method for biosolids limits the potential for odors and in part because he takes a proactive approach to outreach. For example, he frequently conducts tours of the site for any interested party. It was suggested that he maintain a site log of such visits.
- As noted earlier, staff participated in a discussion with the Maryland Department of the Environment (MDE) as a member of a task force to look at the revised biosolids use regulations in the state.
- MES staff, DC WASA staff, and representatives of the Virginia Biosolids Council participated in the booth display at the annual meeting of the Virginia Association of Counties on November 12 and 13. The DC WASA booth was staffed, at different times, by DC WASA, Maryland Environmental Service (DC WASA contracted inspectors), the Virginia Biosolids Council, and a VACO member to give the conference participants a variety of perspectives on biosolids recycling. Staff made several contacts and agreed to forward information to individuals interested in the biosolids issue.
- Staff attended the Mid-Atlantic Biosolids Association board of directors meeting in Baltimore in December. Chris Peot, DC WASA'S Biosolids Division Manager, agreed to continue to serve as president of the organization, and was to continue involvement in the research program, in 2007 entering it's fourth year of funding innovative work dealing with odors and fecal regrowth. In 2006, Western Lake Superior Sanitation Authority of Duluth Minnesota joined so it could contribute to and benefit from the research program. WLSSA agreed to fund half of the 2007 research program with Virginia Tech and Bucknell University.
- During the year, the Biosolids Division Manager added more than 100 people, including county officials, to the interested parties email distribution list and invited them to meet with DC WASA or MES staff to receive more information about the biosolids program.
- MES staff developed and implemented a quality control procedure for the field inspection data. The standard procedure identifies and corrects erroneous data and describes data archiving practices.
- Beginning in 2004, issues related to well discharge zones had come up periodically from members of the public. Buffer zones are 100 feet from water supply zones such as wells and springs. DC WASA began working with well experts to gain information on the topic and in 2006 the agency commissioned a report to determine scientific criteria that could be used for increasing well buffer zones at wellheads during land application around compromised wells.

BIOSOLIDS PROGRAM SUSTAINABILITY

The following activities are among the ways DC WASA ensures that its biosolids will be publicly acceptable in the long run as a beneficial product, and that its biosolids management program can be sustained and improved:

1. Seek to expand current permitting for land application and other beneficial uses
2. Conduct or participate in and support cutting-edge research to ensure biosolids remain safe and useful
3. Continuously review contractor activities to ensure they are meeting requirements and progressing toward biosolids management goals

2006 GOALS AND MILESTONES

4.1 Increase program reliability by using several management methods and contractor services

- Land-apply biosolids in other geographic areas than those used in FY 2004/5.
- Continue reviewing contracts to consider alternatives to current service providers in meeting biosolids EMS goals.
- Explore biodiesel and other options for biosolids reuse.

4.2 Promote and support biosolids-related research

- Tailor research projects to support biosolids diversity and digesters.
- Fund a minimum of two odor reduction research projects in FY 2006 and FY 2007.
- Fund a minimum of two non-odor-reduction research projects in FY 2006 and FY 2007.
- Fund at least one research effort related to polymer dosing.
- Fund at least one research effort related to P-source coefficients.
- Seek EPA Clean Water Act award for research.

Composting and Biodiesel Opportunities

In 2006, the agency began investigating opportunities for using biosolids to create biodiesel and compost, separate efforts that would diversify recycling options.

Composting

Composting could be done at the Blue Plains plant to create a Class A product and could save as much as $400,000 a year in hauling costs. A site was identified on the plant and plans for a pilot project were to be implemented in 2007. Preliminary indications were that the Washington DC metro market could sustain as much compost as the agency could produce.

Biodiesel

Pure biodiesel is a biodegradable, non-toxic, clean-burning fuel made from vegetable oils, algae, animal fats, and recycled restaurant greases. In the US, soybeans are a major source of vegetable oil, with more than 75.5 million acres planted in 2006 (USDA data), accounting for $20.1 billion in farm cash receipts from $1.888 million bushels yearly. Biodiesel can be used in compression-ignition (diesel) engines with few or no modifications, and it can be blended at any level with petroleum diesel to produce a biodiesel blend. Because of the growing soybean industry in nearby Maryland, farmers have been seeking markets for soybeans, especially for periods of surplus production.

Biodiesel is created through a chemical process called transesterification, where a short-chain alcohol such as methanol or ethanol is used to separate glycerin from the fat or vegetable oil, leaving behind two products: biodiesel and glycerin, a byproduct used in soaps and other products. According to some studies, biodiesel can produce about 60% less net carbon dioxide emissions than petroleum-based diesel. Biodiesel can also be used as a heating fuel in domestic and commercial boilers.

DC WASA staff have been in discussions with area farmers on ways to use biosolids as fertilizer on soybean fields and, in return, use resulting biodiesel to fuel its truck fleets. Plans also were underway to explore how glycerin could be used instead of methanol as a carbon source for biological nutrient removal during wastewater treatment.

Expanding End-Use Sites

In 2006 Recyc Systems, one of the agency's biosolids haulers, applied for a permit to apply biosolids in Rappahannock County, VA, which had banned the practice in the early 1990s. Synagro, the land application

contractor, reported that it expected to be using more Blue Plains biosolids in mine reclamation work because a new section of the Ileuca mine in Dinwiddie County VA was being prepared. In addition, other mine reclamation and forestry sites in Virginia and West Virginia were being explored.

Research

Three projects were pursued in 2006 under a biosolids research program funded by the Blue Plains Regional Committee, which includes DC WASA:

1. Researchers at Virginia Tech University were studying the **impact of biosolids application on forested sites to water quality and tree growth.** At the study site in Amelia County, they applied different levels of biosolids to a loblolly pine plantation to measure the flux of nutrients leaving the site in ground and surface water. The project was designed to identify the maximum level of biosolids amendment that would benefit the trees without compromising water quality. Forestry application has become an increasingly important option for Blue Plains' biosolids contractors and was expected to account for more biosolids end use as nutrient management regulations in Virginia take effect.

2. Anecdotal evidence has shown for years that biosolids help farmers get through drought conditions. Researchers at Virginia Tech began studying the potential for crop plants grown in soil amended with biosolids to exhibit **greater tolerance to drought and other forms of stress** in the environment.

   During a previous DC WASA odor reduction research project, researchers had found that microorganisms in the wastewater treatment process break down proteins into amino acids. One, tryptophan, naturally occurs in biosolids and is not present in inorganic fertilizers. This breaks down further to an auxin (indole acetic acid), a class of plant growth substance (often called phytohormones or plant hormones). Auxins play an essential role in coordinating many growth and behavioral processes in the plant life cycle.

   Dr. Erik Ervin's work, presented in a paper titled *Auxin-Boosted Biosolids Effects on Drought-Stressed Grass,* showed that plots of turf grass treated with boosted levels of tryptophan gave crops better drought resistance than plots without. Further studies are planned to look for other essential plant hormones and other conditions that might promote drought resistance with biosolids use.

3. Researchers at Penn State University were developing a formula for **translating levels of water-extractable phosphorus in individual biosolids into source coefficients** ("P-source coefficients") that could be used in various phosphorus site indexes in the mid-Atlantic region. The project could expand the viable land base for Blue Plains biosolids once phosphorus-based nutrient management requirements are fully implemented in Virginia. Should funding be found, Council of Government (COG) staff could use the research results to educate state regulators to allow for this option under nutrient management programs.

Other research funded or supported by DC WASA:

- The Washington Suburban Sanitary Commission funded a project that involved Blue Plains biosolids. Researchers at the University of Maryland were analyzing groundwater samples to study the **fate and transport of nitrogen and other nutrients in the deep-row trenching-tree planting system** pioneered at the ERCO gravel mine reclamation site in Prince George's County, Md. The researchers also were studying the impact on tree growth of different fertilizer and spacing rates and the overall economics of the system. Depending on the results, the system may provide another option for using Blue Plains biosolids at additional such sites throughout the region.

- ERCO also was involved with helping University of Maryland researchers launch several new projects to explore the **use of biosolids and poultry litter to grow hybrid poplars without contributing to water pollution.** One of the projects was to be conducted by Dr. Gary Felton at the Beltsville Agricultural

Research Center and another at the university's Wye research farm on the Eastern Shore. In both cases, the trees would be planted conventionally and biosolids or other soil amendments would be surface-applied.

- Synagro reported that it was working with a consulting firm in Wisconsin to investigate the **impact of biosolids amended with water treatment plant residuals containing alum or with commercial-grade alum on soil test phosphorus levels.** Such information could be important to future operations in the mid-Atlantic region where there is increasing emphasis on phosphorus-based nutrient management.
- Research findings in a recently released Water Environment Research Foundation (WERF) study, *Fecal Regrowth and Reactivation*, detailed the **regrowth of fecal bacteria after undergoing certain digestion and dewatering processes.** Blue Plains' biosolids does not exhibit the phenomenon. DC WASA staff served as co-principle investigators and project advisors.

  Because of the potential implications on public attitudes towards biosolids, several efforts to address the issue were being undertaken by individual generators, WEF, and other organizations. In August, DC WASA staff presented the results of the study to the Maryland Association of Municipal Water Agencies (MAMWA). Representatives were given an overview of the findings and the future direction of the research. Similar presentations were planned for VAMWA (Virginia). The agency also hosted a meeting at Blue Plains to discuss the findings that drew more than 75 people.
- Sometimes biosolids odors drift from land application sites into surrounding neighborhoods and the true benefits of biosolids recycling may be masked by this nuisance and result in community opposition or legislative bans against biosolids nutrient recycling. Therefore, reduction of odor emissions from biosolids recycled on field sites is a major concern, so DC WASA sponsored the following research:

  1. **Practical biosolids odor prediction models** were developed in a study of sensory and analytical measurement approaches to be used by managers for predicting the odor emission rates of biosolids generated daily at Blue Plains. These models evaluated daily wastewater treatment process data and predicted the expected biosolids odor emissions levels prior to recycling this material on land.

     This study developed odor prediction models using explanatory wastewater treatment process variables. The goal was to provide a simple tool for early detection of biosolids odor emissions so the biosolids manager can notify the hauling contractor when malodorous biosolids may be generated by the wastewater process. This model could be used to send malodorous biosolids to remote sites where odor is not an issue, reducing or preventing odor complaints from nearby communities.

  2. **A real-time odor monitoring system was developed** to evaluate and predict odors levels of dewatered solids generated at Blue Plains. With an online electro-chemical headspace monitoring device, odors measured as total volatile reduced sulfur compounds. These compounds are a major component of odors generated by wastewater treatment processes.

     This study correlated odor levels of dewatered biosolids to various operational parameters throughout the wastewater treatment process and statistically forecast total volatile reduced sulfur odor emissions of dewatered solids prior to recycling on agricultural fields. The study demonstrated a statistical model that forecast which operational parameters were significant contributions to odors and could be used to forecast biosolids odor. As predicted, the model indicated that secondary blanket depth was the most significant factor for odor levels of dewatered solids and that blankets of more than 1.8 feet would cause significantly more odors. This model also found that polymer addition at the dewatering process increased as solids odor increased. The findings were used to make operational changes at the agency.

DC WASA did not pursue a Clean Water Act award for research in 2006, one of its goals, because it was considered ineligible for another given that it had won one for best managed biosolids program in 2005.

ENVIRONMENTAL PERFORMANCE

Reducing the potential to pollute the environment remains a key agency objective. Apart from meeting all its legal and regulatory requirements, DC WASA has a robust program to do even better than parameters for pollutants require, and to go beyond any requirements by reducing greenhouse gasses and using chemicals more efficiently.

2006 GOALS AND MILESTONES

5.1 Reduce potential to pollute the environment.

- Participate in WASA wastewater facility ISO 14001 implementation.
- Evaluate at least one opportunity for source reduction of metals in biosolids.
- Evaluate use of onsite chemicals to be more efficient, effective, and environmentally responsible.

- DC WASA staff calculated and includes in its monthly report a graph showing the greenhouse gas benefits derived from its biosolids recycling program. These calculations are based on work performed by University of Washington researchers and the King County Metro (Seattle) biosolids recycling program, and have been adapted to Blue Plains tonnages and processes. In short, the benefits are derived from avoiding use of inorganic fertilizers (which require energy to produce – assumed to be derived from non-renewable fossil fuels) and from carbon sequestration in farm field soils. Taking into account the fuel to transport biosolids to the field, the net benefit is still substantial, totaling 2,931 metric tons of CO_2 equivalent in avoided emissions just in December. This is equivalent to taking 6,646,673 car miles off the road that month (assumes 20 mpg, 19.4 lb CO_2 emissions/gal. gas – EPA est.).

- In April, staff met with three vendors to discuss gasification technology and the related biosolids recycling opportunities. The DC WASA Department of Engineering and Technical Services (DETS) agreed to assess the technology, determine where it has been used successfully, and evaluate how the technology can fit in with the existing Blue Plains Biosolids Master Plan.

  To identify the extent to which compounds other than metals are addressed by the biosolids program and whether that information could be used to demonstrate progress in reducing the potential load of compounds in biosolids, the pretreatment staff began compiling data on significant industrial dischargers. These dischargers fall into one of two categories: those for whom discharge limits are set directly by EPA – known as categorical users and largely involved in metal finishing work – and non-categorical users whose discharge limits are derived locally, which include a range of businesses and government agencies. The staff also provided information, distributed via the Virginia Biosolids Council's quarterly newsletter, on how trash and grit is removed, which contractors can use to address public concerns.

- On November 16, DC WASA staff attended a forum entitled "Endocrine Disruptors: What We Know & What We Don't" in Frederick, MD, to discuss how the issue affects the region's waters. The University of Maryland Mid Atlantic Regional Water Program sponsored the forum. DC WASA is funding two related projects with USDA/UofMD entitled "Environmental Fate of Brominated Flame Retardants from Biosolids Land Application Programs" and "Assessing the Fate of Triclosan and Triclocarbon in a WWTP with Emphasis on Sludge Processing and Land Application of Biosolids." Results were expected in 2007.

- DC WASA biosolids program uses lime and polymer chemicals in the treatment process. As noted earlier, the agency was developing temperature-infrared sensors to detect changes in biosolids temperatures after lime addition so that pH levels can be managed better.

  Another success involved reducing the potential for overdosing with polymer, which can lead to odorous biosolids. Two polymers are used during dewatering: a dry polymer to which water is added, and, as a backup, an oil-based emulsion that is more concentrated. Some operators were unwittingly using the latter at the same dosage as the dry polymer, thereby overdosing. Operators then were re-trained on dosing and detecting the fishy odors that result from overdosing. In addition, any change in polymer dosing must be communicated so contractors can send odorous biosolids to a remote site. Field site inspectors already take odor readings that have descriptors such as "dead fish," "ammonia," or "sulfur," each indicating that a different process may be responsible for the odor.

OUTLOOK FOR 2007

Through DC WASA's biosolids program and EMS, basic goals have been addressed, such as managing environmental impacts, embracing public involvement, ensuring consistent product quality, more than meeting regulatory requirements, and having a system to identify improvements. The much more challenging task has become improving on all these things. Environmental assessments are now only one item on the "to-do" list. Product quality improvements, cost savings and waste reduction through efficiencies, and collaboration to prepare for future market conditions are on the list, too.

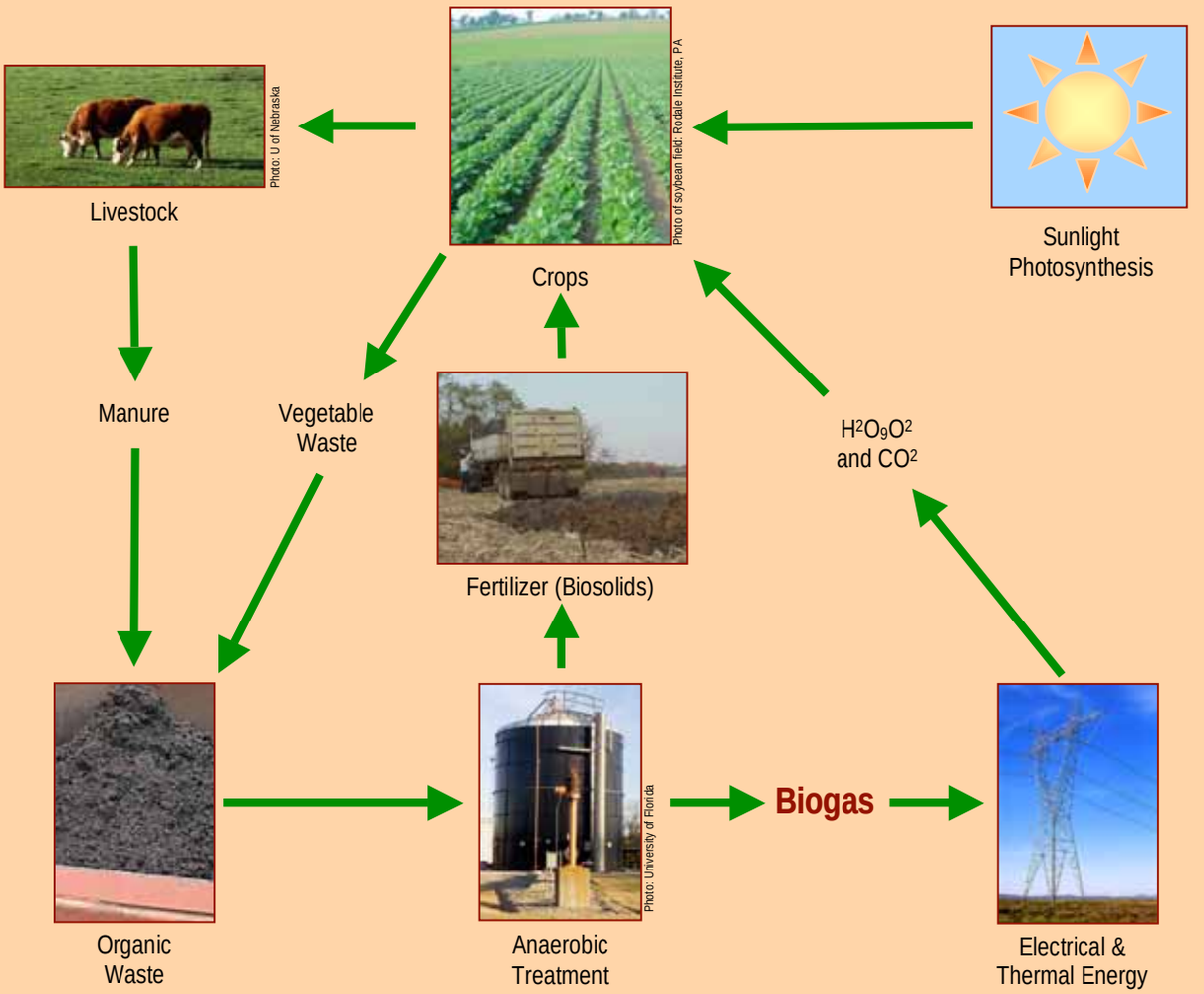
Today, DC WASA is taking an aggressive, pro-active approach, addressing lifecycle administration of biosolids, pursuing research to address anticipated issues, collaborating with other agencies, and always working to educate and heed its public. Among improvements anticipated for 2007:

- Tracking and increasing public and other stakeholder outreach and input
- Automating more processes to reduce errors and increase efficiencies
- Reporting all incidents using an automated system
- Identifying problem causes using pull-down menus for ease of use and to track trends
- Linking high-level organizational goals through a chain to biosolids targets, using a "logical framework" process and SMART criteria
- Ensuring goals continue to be consistent with industry standards for good practice
- Working even more closely with other departments, including liquid treatment, maintenance, and procurement
- Identifying all control points, including those related to business continuity risks
- Improving the management review process, including more comprehensive internal audits
- Implementing more targeted training at all levels
- Implementing operations that make biosolids output even more consistent and higher quality
- Boosting research in promising areas and applying results effectively
- Exploring more end-use options for biosolids, including expanded land reclamation sites, soybean field amendments for biogas uses, and composting
- Improving the management review process, including more comprehensive internal audits
- Implementing more targeted training at all levels
- Implementing operations that make biosolids output even more consistent and higher quality

ISO 14001

Because of the evident benefits of the NBP EMS, which included reduction in pollution, public acceptance of the agency's "product," improved compliance, and improved quality management, in 2006 DC WASA explored how to build on this success for the entire plant by applying the international environmental management system standard, ISO 14001, throughout the entire facility, beginning with the liquid treatment division.

Initial meetings were conducted with several biosolids departments and an implementation plan was started. Events related to the decision to postpone anaerobic digester construction delayed progress on this plan, as did the need for the Biosolids Division staff to prepare for a third-party NBP audit. Biosolids staff were taking the lead on ISO 14001 because of its experience with the NBP EMS. Development and implementation were expected to continue in 2007.



DC WASA is exploring a process that would use anaerobically treated solids to generate biogas for energy at the Blue Plains Advanced Wastewater Treatment plant. Biogas (methanol) also could supply carbon for use by microbes in digestion. Some processes use vegetable waste and manure to feed into the anaerobic treatment system. The treated solids (biosolids) produced at DC WASA are used as fertilizer for crops and to revitalize barren sites such as mines.