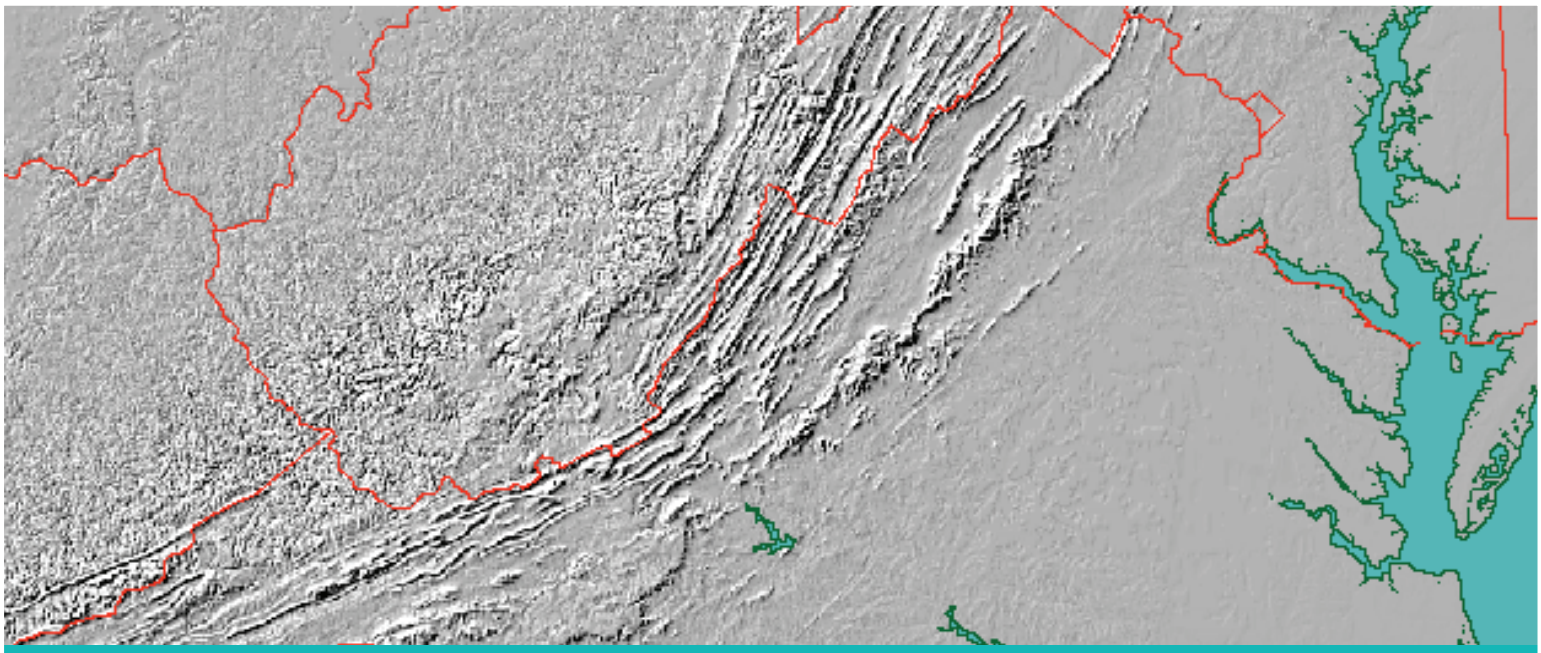

Biosolids Management Program

Annual Report 2007

District of Columbia Water and Sewer Authority

Biosolids Division

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Introduction

"Sustainability," "green tech," "carbon footprint" – The District of Columbia Water and Sewer Authority (DC-WASA) biosolids division has been practicing for several years what others are just now preaching. 2007 saw another upward trend in accomplishing green and economical goals.

In October 2004, DC-WASA became certified to the voluntary National Biosolids Partnership (NBP) Environmental Management System (EMS) program, which is approved by the US Environmental Protection Agency. The biosolids program undergoes comprehensive internal audits in preparation for yearly third-party verification audits, which it passed in October 2006 and again in September 2007.

The EMS program, known as the "biosolids management program," ensures that the agency carries out the following tasks:

- Identifies potential environmental impacts and critical process points, and makes sure they are monitored and controlled
- Establishes procedures for meeting system requirements
- Identifies stakeholders, ensuring there is a communication loop
- Establishes a method to identify, track, fix, and prevent problems
- Maintains a constant upward improvement trend
- Requires continual management review to make sure the system works and policy commitments are met
- Is audited yearly to make sure it meets requirements

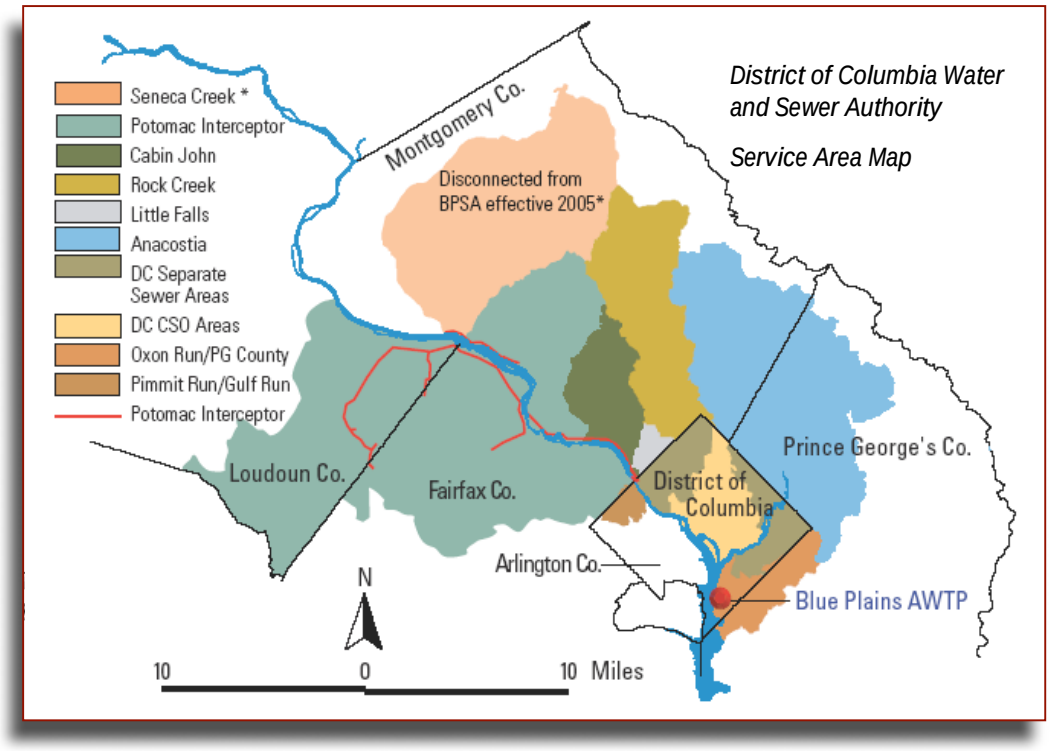
This annual report provides an update on the biosolids division's accomplishments in 2007.

Treatment Process

DC-WASA 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. Another 13 percent comes from Loudoun and Fairfax Counties, Virginia.

DC-WASA biosolids consistently meet Environmental Protection Agency Class B standards for biosolids, which renders them safe for recycling as fertilizer for agricultural and other land use.

Wastewater entering the plant is screened, and filtered in a grit chamber from where it passes through primary and secondary sedimentation tanks to remove organic particles. Water is further processed by nitrification (not part of the biosolids program) and solids are gravity-thickened before a centrifuge further dewaters them. Lime is used to stabilize the solids. The plant is operated from a central operations room and through field operations overseen by independent inspectors.



State of the Program

Management Reviews Progress

At the November 28, 2007 Biosolids Workgroup meeting, the biosolids management program was reviewed by members of the workgroup as part of its annual management review process. The review addressed whether the overall biosolids management program remains suitable, adequate, and effective to meet the agency's biosolids policy commitments and program goals, and whether it meets the desired outcomes of the program. These outcomes are:

- Quality management practices
- Good relations with interested parties
- Regulatory compliance
- Excellent environmental performance
- Business continuity
- Continual improvement

The answer remains: "Yes!"

The biosolids management program has been very beneficial in making biosolids processes more efficient and effective over the last few years. As a program that relies on cooperation among DC-WASA leaders, departments, and staff, along with contractors, regulators, and the public, it is essential for maintaining good communication and goal-setting, for achieving those goals, and for improving processes and outcomes as it responds to community needs.

With the management system in place, DC-WASA has continued to have no environmental violations, and has maintained consistently high biosolids quality. The public has accepted biosolids in communities throughout Virginia and Maryland, albeit with pockets of resistance. Outreach and response to complaints has been robust, either directly from agency staff or through its representatives. It is implementing facility upgrades and alternative recycling options to ensure business continuity. And it is preparing to meet regulatory changes.

With maturity, the management system makes it easier to identify areas for improvement, where sometimes minor attention can have major beneficial consequences. DC-WASA is now fostering public embrace, not merely acceptance, of biosolids as a valuable recycled product.

As the largest advanced wastewater treatment plant (AWTP) in the world, DC-WASA continues to be a leader in environmental stewardship.

Policy Commitments Met

The agency has met all its biosolids management program policy commitments:

1. Compliance: The agency has complied with all applicable federal, state, and local requirements regarding production at the wastewater treatment facility, and management, transportation, storage, and use or disposal of biosolids away from the facility

2. Product: DC-WASA has met or exceeded the applicable standards for the intended end-use of biosolids.

3. Environmental Management System: DC-WASA has maintained its third-party certification to the National Biosolids Partnership's environmental management system. More important, the agency has maintained the *spirit* of the EMS by going beyond requirements of that particular system.

4. Quality Monitoring: Biosolids production and management practices have been monitored using SMART criteria, management reviews, internal audits, and third-party audits.

5. Quality Practices: A new housekeeping program was established to improve onsite practices for biosolids production and processing. Quality management practices for biosolids transport, storage, and during use or disposal operations have met or exceeded commitments.

2007 Highlights

- The DC-WASA biosolids program passed its second interim third-party environmental management system audit.
- Through process improvements, DC-WASA prevented the equivalent of nearly 30,000 metric tons of CO_2 emissions.
- Public outreach efforts contributed to a win-win Virginia county biosolids ordinance that supports land application.
- DC-WASA worked with Virginia state officials to help create an active biosolids oversight program under the Virginia Department of Environmental Quality, which was to assume control of the program from the Department of Health in January 2008.
- A pilot composting operation produced its first bag of Class A biosolids at the Blue Plains site.
- Urban Service Systems Corp., which subcontracts land-application to Nutri-Blend Inc., has joined Recyc Systems Inc. as a biosolids hauling and land application contractor for DC-WASA.
- More than $1 million was saved in hauling costs from producing drier – and thus less -- biosolids.

6. Contingency and Emergency Response Plans: The agency maintains response plans for unanticipated events such as inclement weather, spills, and equipment malfunctions

7. Sustainable Management Practices and Operations: The agency is enhancing the environment by committing to sustainable, environmentally acceptable biosolids management practices and operations through an environmental management system, including through re-use programs such as composting, and by supporting cutting-edge research. The agency is also in the midst of planned upgrades that are likely to include a thermal digestion system, further reducing its carbon footprint and the total tonnage of biosolids produced.

8. Preventive Maintenance: The agency's preventive maintenance program received high marks in the last audit and resulted in evident operations efficiencies that saved time and money all year.

9. Continual Improvement: Through its biosolids management program, goals and action plans, management review, corrective and preventive action program, and ongoing monitoring and measurement systems, the agency maintains continual improvement in its products, practices, and services.

10. Communication: The agency provides several methods of effective communication with gatekeepers, stakeholders, and interested citizens regarding the key elements of each environmental management system, including information relative to system performance

Management reviews include monthly Biosolids Workgroup meetings involving DC-WASA, WSSC, and contractor management to discuss ongoing issues, and monthly General Manager meetings and reports discussing overall biosolids program performance. According to the auditor, "These reviews have been effective in maintaining and improving the biosolids program and in communicating biosolids program requirements."

Areas for Improvement

The management team review found that the system could be improved further in the following ways:

The corrective action system: This can be improved to make it easier to identify priority action items with transparent and articulated reasons for them.

The change management process: Possible, probable, and planned changes in personnel, tasks, equipment, regulations, strategic plans, facility plans, etc. should be more comprehensively reviewed to determine possible consequences beyond their immediate and known effects. This will reduce the chances that unanticipated results will require resources.

Communication: The website should be kept up to date, and this may entail more collaboration with the public affairs department. Wastewater and solids divisions should be communicating more regularly about changes in processes, goals, and desired outcomes. Wastewater treatment personnel should be regular attendees at monthly Biosolids Workgroup (BWG) meetings. Audit and goals should be communicated better to all parties, with feedback opportunities. County monitors can be valuable for input, as can DEQ personnel, and should be invited to BWG meetings. Valuable information can be more widely communicated, such as the fact that DC-WASA has independent inspectors at every biosolids site, and that research is further demonstrating the safety of biosolids.

Training: New modules were planned for during duty station training and for biosolids-oriented tailgate sessions. Regular training on the biosolids policy and goals should be conducted up and down the management chain.

Good housekeeping practices have made DC-WASA's grounds pleasant to walk through. This is a view toward the headquarters building.

Goals metric: Improvements can make progress clearer. For example, odor "improvement" is not well defined. A corollary to this is that when goals are achieved, it would help to articulate the causes more clearly.

Root-cause analysis: This should be more formalized. This activity will contribute to prioritizing goals and to understanding and communicating their merits. A drop-down menu in the reporting and corrective action system to track trends can help.

Audit Results

KEMA-Registered Quality Inc. (KEMA) conducted an independent audit of the EMS from September 17 to 19, 2007 at the request of the National Biosolids Partnership. This was the second interim following verification of the DC-WASA biosolids EMS in 2004.

The purposes of this audit were to:

- Verify that the biosolids EMS being used by DC-WASA conforms to requirements of the National Biosolids Partnership (NBP) Environmental Management System for Biosolids, composed of 17 EMS Elements
- Confirm that the DC-WASA biosolids EMS is functioning as intended, with practices and procedures being performed as documented.
- Determine if DC-WASA is achieving desired outcomes through the use of its biosolids EMS.

During this audit KEMA noted the following strengths in the DC-WASA biosolids program:

- "Biosolids land application operations and related contractor control is effective in ensuring compliance and communicating with interested parties."
- "The newly introduced corrective action tracking system is a good way of communicating and recording the status of agreed actions."
- "The Maintenance Department makes good use of monitoring and measurement to identify and implement continual improvement opportunities."

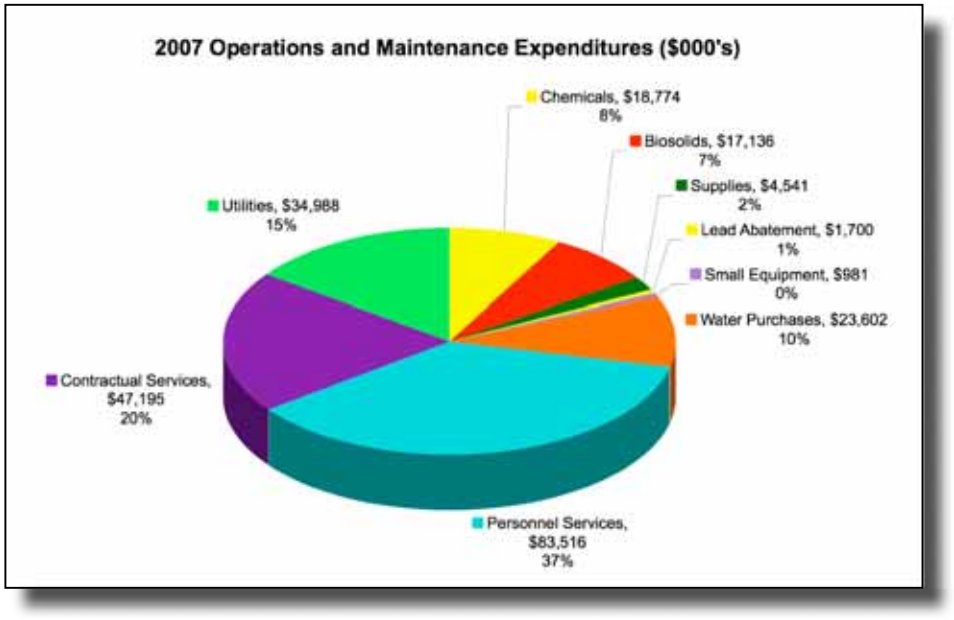
KEMA also found seven minor nonconformances involving areas for improving documentation, training, contractor agreements, and management review. According to the audit report, "Review of these nonconformances determined that they are not related and do not represent a systemic deficiency." It also reported that minor nonconformances from the previous audit had been corrected.

DC-WASA immediately developed a corrective and preventive action plan (CAPA) and began implementing it in late October.

Based on the audit and on accomplishments noted below, the audit determined that "DC-WASA's overall biosolids program is improving through the use of its EMS approach to managing the program." The agency's EMS received verification approval in October 2007.

Management Support

The DC-WASA Board of Directors, General Manager, and management leadership consistently support the mission and goals of the Biosolids Management Division by allocating resources in the form of budgets and personnel, and by articulating management support for the biosolids program to staff, the public, and other stakeholders. This has allowed the division to succeed in meeting its stated goals and in achieving its desired outcomes. Continuing support allows the division to make both short-term and long-term plans that promise future returns on investments made today.



Accomplishments

Incidents Continue to Drop

A key indicator of improvements is the number of offsite significant incidents reported. Between 2006 and 2007, total reported incidents went down by 23 percent and reported odor incidents dropped by 20 percent. Over the last two years, odor-related incidents went from 19 reported in 2005 to 5 in 2007 and other incidents dropped from 31 to 20 in that period. 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

The management review determined that these improvements were the result of a combination of more consistent biosolids production practices, improved preventive maintenance of equipment, better biosolids quality monitoring onsite and offsite, and continuing good communication among land application and inspection contractors and DC-WASA staff.

Summary Comparison of Incidents

Year	Total Incidents	Odor-Related Incidents
2007	**20**	**5**
2006	**26**	**7**
2005	**31**	**19**

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

Limits Surpass EPA Standards

Fecal coliform in the lime-stabilized biosolids remained substantially below limits. In fact, fecal coliform levels, on average, were low enough to consistently meet Class A standards for this indicator organism. (See chart.)

Effluent Parameter	EPA Permit Limit Mo/Avg *(mg/L)*	DC-WASA Data 2007 Mo/Avg *(mg/L)*
Carbonaceous biochemical oxygen demand (CBOD)	5.00	2.46
Total suspended solids (TSS)	7.00	0.65
Total phosphorous (TP)	0.18	0.08
Total nitrogen	7.5 (goal)	5.92
Ammonia nitrogen (NH-3N)		0.68
Summer (May 1-Oct 31)	4.20	0.62
Winter 1 (Nov 1-Feb 14)	11.10	0.57
Winter 2 (Feb 15-Apr 30)	12.80	1.22
Dissolved oxygen (DO) minimum daily	5.00	8.77
Dissolved oxygen (DO) minimum instantaneous	4.00	8.08
Total chlorine residual	0.02	Non-detect
pH (minimum)	6.0	6.7
pH (maximum)	8.5	6.9
Fecal coliform (#/100 ml)	200.0	2.46
Biosolids Parameter	**EPA Permit Limit Mo/Avg *(mg/L)***	**DC-WASA Data 2007 Mo/Avg *(mg/L)***
Fecal coliform (#/g – Class B)	2 million	<3,200
As (ppm)	41	2.3
Cd (ppm)	29	0.57
Cr (ppm)	No limit	26
Cu (ppm)	1,500	162
Pb (ppm)	300	28
Hg (ppm)	17	0.4
Mo (ppm)	No limit	8.3
Ni (ppm)	420	14
Se (ppm)	100	3.2
Zn (ppm)	2,800	347

Biosolids Recycling Makes Carbon Footprint Tons Smaller

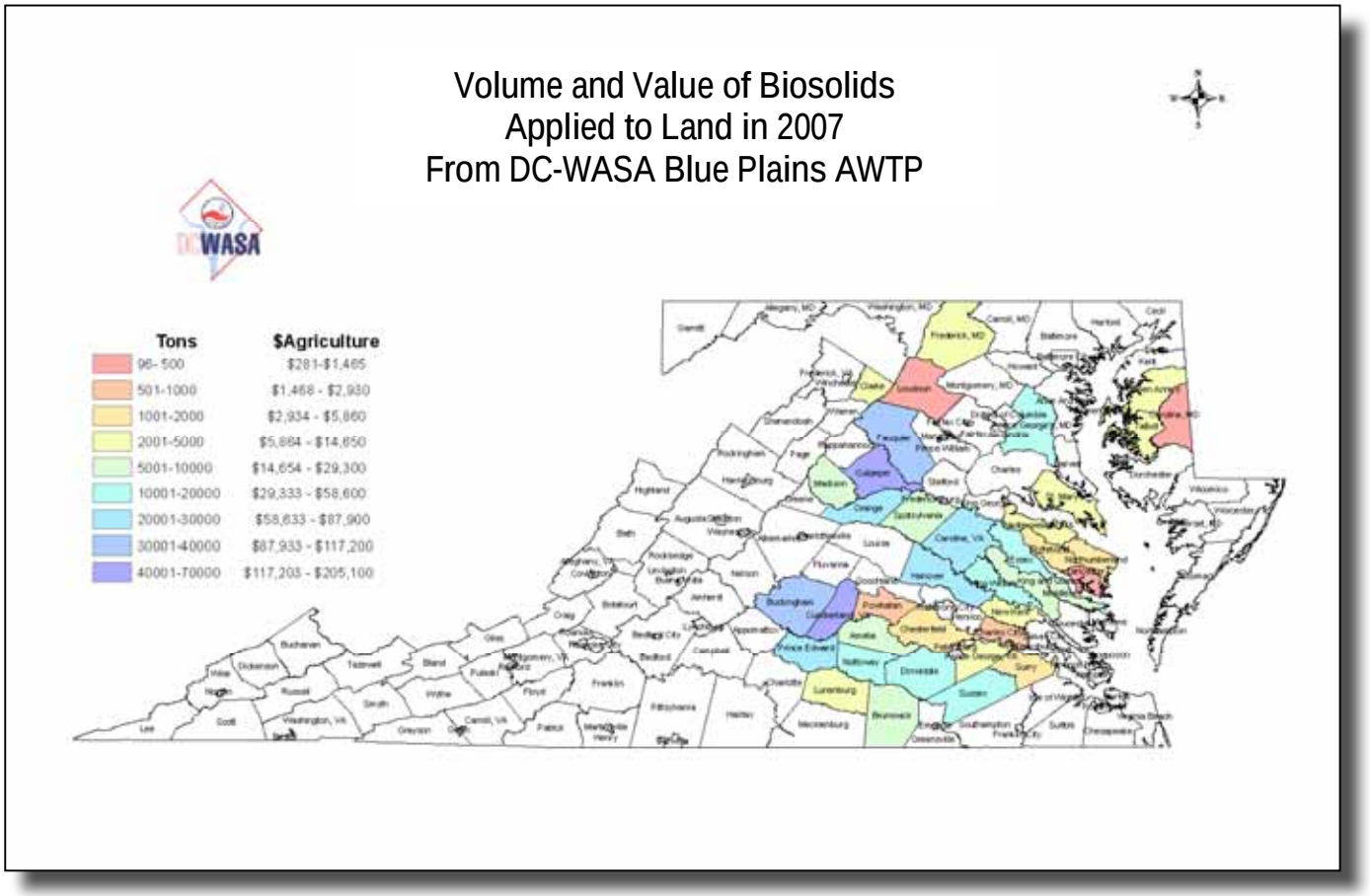
Environmental sustainability remains one of DC-WASA's overarching missions. By recycling biosolids, DC-WASA and farmers avoided releasing thousands of metric tons of carbon dioxide into the air.

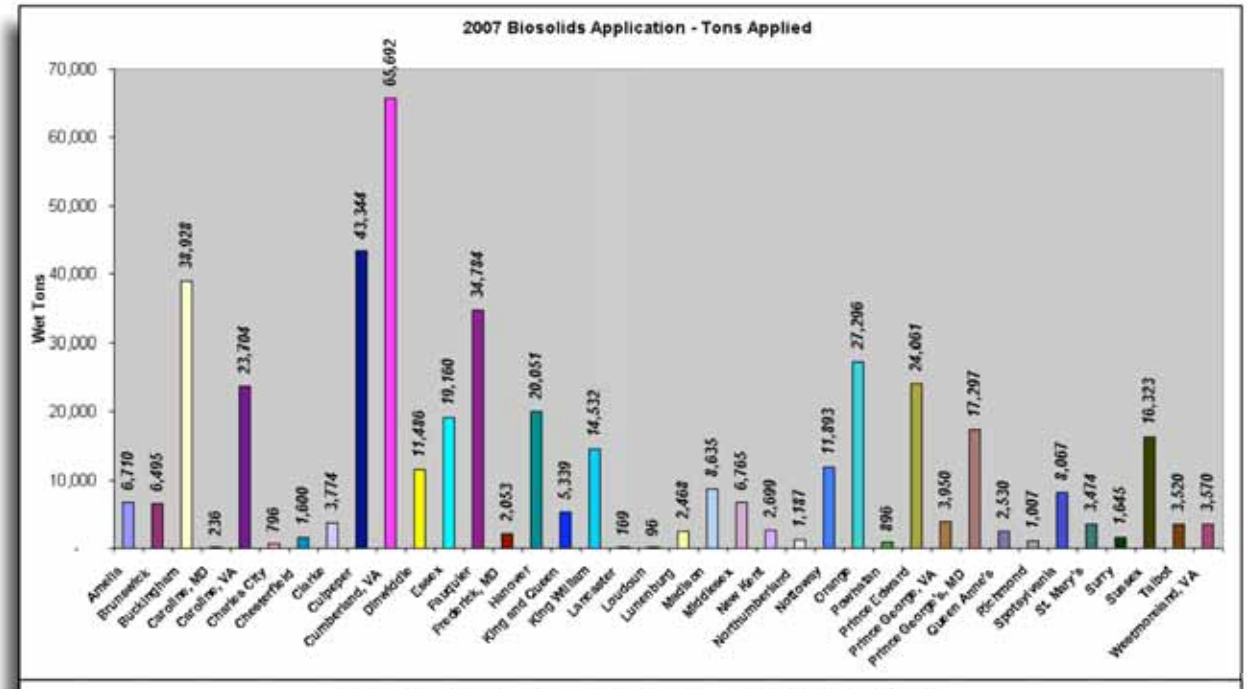
Each month, DC-WASA reports on biosolids land application by county, including quantities generated and end-use distribution by state. In 2007, DC-WASA contractors land-applied 466,709 tons of biosolids, and sent only 2,103 tons to a landfill.

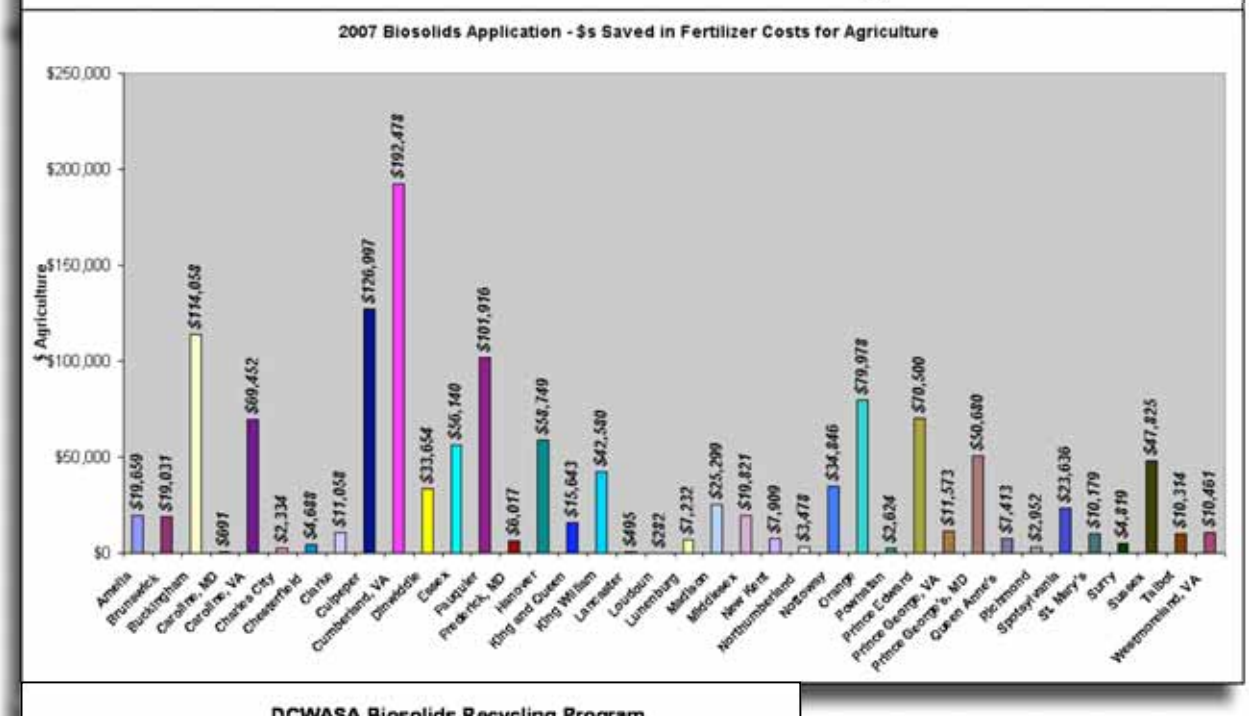
By converting biosolids to "greenhouse gas" equivalents, the environmental value of biosolids application and the benefit of land use over landfill become evident. The total dollars saved in nitrogen and lime provided by biosolids to Virginia farmers that they otherwise would have had to purchase in organic fertilizers in 2007 exceeded $1.3 million.

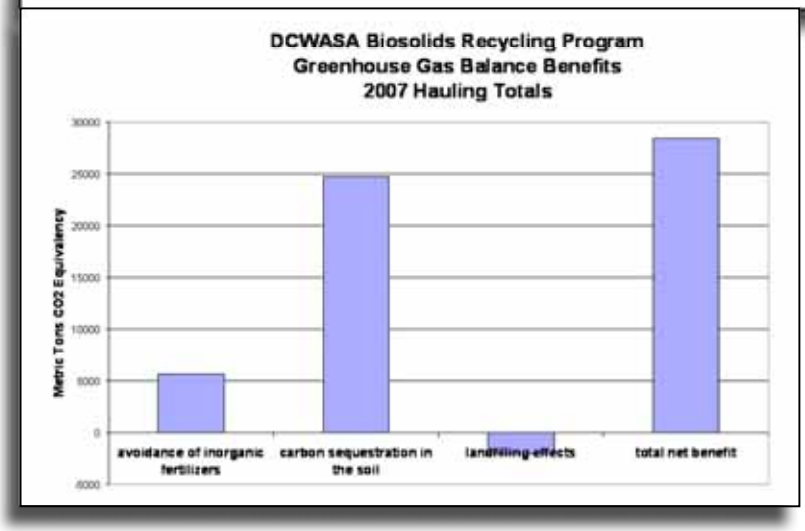
The chart at the top of the next page shows the tons applied per county in Virginia, and the dollars the biosolids were worth in terms of fertilizer costs are shown in the chart in the middle of the next page.

Had the biosolids been landfilled, the equivalent of nearly 30,000 metric tons of CO_2 would have been released into the atmosphere (bottom of next page).




2007 Biosolids Application - Tons Applied
Wet Tons
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
6,710
6,495
38,928
236
23,704
706
1,600
3,774
43,344
65,692
11,480
19,160
34,784
2,053
20,051
5,339
14,532
169
96
2,468
8,635
6,765
2,699
1,187
11,893
27,296
896
24,061
3,950
17,297
2,530
1,007
8,067
3,474
1,645
16,323
3,520
3,570
Amelia
Brunswick
Buckingham
Caroline, MD
Caroline, VA
Charles City
Chesterfield
Clarke
Culpeper
Cumberland, VA
Dinwiddie
Essex
Fauquier
Frederick, MD
Hanover
King and Queen
King William
Lancaster
Loudoun
Lunenburg
Madison
Middlesex
New Kent
Northumberland
Nottoway
Orange
Powhatan
Prince Edward
Prince George, VA
Prince George's, MD
Queen Anne's
Richmond
Spotsylvania
St. Mary's
Surry
Sussex
Talbot
Westmoreland, VA


2007 Biosolids Application - $s Saved in Fertilizer Costs for Agriculture
$ Agriculture
$250,000
$200,000
$150,000
$100,000
$50,000
$0
$19,859
$19,031
$114,058
$691
$69,452
$2,334
$4,688
$11,058
$126,997
$192,478
$33,654
$56,140
$101,916
$6,017
$58,749
$15,643
$42,580
$495
$282
$7,232
$25,299
$10,821
$7,909
$3,478
$34,846
$79,978
$2,624
$70,500
$11,573
$50,680
$7,413
$2,952
$23,636
$10,779
$4,819
$47,825
$10,314
$10,461
Amelia
Brunswick
Buckingham
Caroline, MD
Caroline, VA
Charles City
Chesterfield
Clarke
Culpeper
Cumberland, VA
Dinwiddie
Essex
Fauquier
Frederick, MD
Hanover
King and Queen
King William
Lancaster
Loudoun
Lunenburg
Madison
Middlesex
New Kent
Northumberland
Nottoway
Orange
Powhatan
Prince Edward
Prince George, VA
Prince George's, MD
Queen Anne's
Richmond
Spotsylvania
St. Mary's
Surry
Sussex
Talbot
Westmoreland, VA


DCWASA Biosolids Recycling Program
Greenhouse Gas Balance Benefits
2007 Hauling Totals
Metric Tons CO2 Equivalency
30000
25000
20000
15000
10000
5000
0
-5000
avoidance of inorganic fertilizers
carbon sequestration in the soil
landfilling effects
total net benefit

Improved Centrifuge Process Raises Solids Content and Cuts Output Quantity

Greenhouse Gas and Hauling Costs Reduced

For every percent solids increase, or dryness, in biosolids, DC-WASA can save about $1 million in hauling costs and associated emissions. In 2006, DC-WASA sought a 24% solids content in biosolids, but fell short, which management attributed in part to centrifuges that weren't operating as efficiently as possible. In 2007, the agency hired an operations expert to troubleshoot them.

Along with better equipment maintenance and operations, the result was an increase in solids content from an average of 23% in 2006 to 27% in 2007. Drier solids gave rise to unanticipated challenges related to biosolids flow. Solids were "stickier" and were more difficult to empty out of trucks, but various methods, including using clean straw in the floor of the trucks, alleviated the problem.

The benefits far outweighed this minor challenge. The drier solids reduced the total tonnage and attendant transportation costs and energy use, with expected savings of approximately $3 million over the year. Further savings are expected for 2008, with a two-year goal of reaching an average 30% solids content. The chart below shows the average savings when a current solids percentage is raised to a target solids percentage.

Hauling Cost Differences for Different Cake Dryness

300 dtpd assumed average daily production

cake % solids	cake hauled wtpy	annual cost @ $39.89 per wet ton	annual $ diff by % point
20%	547,500	$ 21,839,775	
21%	521,429	$ 20,799,786	$ 1,039,989
22%	497,727	$ 19,854,341	$ 945,445
23%	476,087	$ 18,991,109	$ 863,232
24%	456,250	$ 18,199,813	$ 791,296
25%	438,000	$ 17,471,820	$ 727,993
26%	421,154	$ 16,799,827	$ 671,993
27%	405,556	$ 16,177,611	$ 622,216
28%	391,071	$ 15,599,839	$ 577,772
29%	377,586	$ 15,061,914	$ 537,925
30%	365,000	$ 14,559,850	$ 502,064

current percent solids achieved with centrifuges

target % solids	20%	21%	22%	23%	24%	25%	26%	27%	28%	29%
20%	$ -									
21%	$ 1,039,989	$ -								
22%	$ 1,985,434	$ 945,445	$ -							
23%	$ 2,848,666	$ 1,808,677	$ 863,232	$ -						
24%	$ 3,639,963	$ 2,599,973	$ 1,654,528	$ 791,296	$ -					
25%	$ 4,367,955	$ 3,327,966	$ 2,382,521	$ 1,519,289	$ 727,993	$ -				
26%	$ 5,039,948	$ 3,999,959	$ 3,054,514	$ 2,191,282	$ 1,399,986	$ 671,993	$ -			
27%	$ 5,662,164	$ 4,622,175	$ 3,676,730	$ 2,813,498	$ 2,022,201	$ 1,294,209	$ 622,216	$ -		
28%	$ 6,239,936	$ 5,199,946	$ 4,254,502	$ 3,391,269	$ 2,599,973	$ 1,871,981	$ 1,199,988	$ 577,772	$ -	
29%	$ 6,777,861	$ 5,737,872	$ 4,792,427	$ 3,929,195	$ 3,137,899	$ 2,409,906	$ 1,737,913	$ 1,115,697	$ 537,925	$ -
30%	$ 7,279,925	$ 6,239,936	$ 5,294,491	$ 4,431,259	$ 3,639,963	$ 2,911,970	$ 2,239,977	$ 1,617,761	$ 1,039,989	$ 502,064

Wet tons produced for differing dry ton production rates and differing % solids from dewatering

target % solids	300 dtpd	310 dtpd	320 dtpd	330 dtpd	340 dtpd	350 dtpd
24%	1250	1292	1333	1375	1417	1458
25%	1200	1240	1280	1320	1360	1400
26%	1154	1192	1231	1269	1308	1346
27%	1111	1148	1185	1222	1259	1296
28%	1071	1107	1143	1179	1214	1250
29%	1034	1069	1103	1138	1172	1207
30%	1000	1033	1067	1100	1133	1167
31%	968	1000	1032	1065	1097	1129
32%	938	969	1000	1031	1063	1094
33%	909	939	970	1000	1030	1061
34%	882	912	941	971	1000	1029

Loading Window Efficiencies Reduce CO_2 Loads

Loading windows for trucks hauling biosolids resulted in reduced stress among drivers, more efficient loading, and lower fuel costs. By having assigned loading slots, truck idle time reductions in 2007 reduced greenhouse gas emission by 2%, or 335 metric tons of CO_2 equivalent.

Reducing CO_2 Equivalent Emissions by Reducing Truck Idle Time	
1,200	Wet tons per day (wtpd)
23	Tons per truck
51	Trucks per day
7	Days per week
365	Trucks per week
0.5	Hours per truck reduced
183	Idle hours per week
9,496	Idle hours per year
4	Gallons per hour consumed during idle
37,983	Gallons saved with loading window improvements
19.4	Pounds CO_2 equivalent released per gal gas consumed
736,863	Pounds CO_2 equivalent reduced from loading window improvements
335	Metric tons CO_2 equivalent reduced from loading window improvements

Pretreatment and Collection Keeps Flow Consistent

Critical control points include the pretreatment and collection system. Industrial users are visited at least annually and corrective action plans are developed to correct and/or prevent violations. Certified labs are used to measure and monitor pollutant loads. Conventional analysis is used to monitor incoming flow and the pretreatment manager regularly reports to the Biosolids Workgroup on issues that may affect biosolids quality. No significant changes in organics or metals have occurred in the past few years and no new trends are apparent.

Good Housekeeping Raises Morale and Increases Productivity

Housekeeping improved during 2007. Onsite biosolids spills caused by conveying system equipment failures not only affected equipment operations and associated drainage systems, response times to correct failures were high and safety was compromised. The conveying system that moves biosolids from the centrifuges to the storage areas is a maze of units that raise or lower, mix, and distribute the biosolids to bunker and silo storage areas.

In the past, these spills required much effort and manpower to remove, delaying timely repairs. For example, spills caused by mechanical failures were removed by physical labor, shoveling, and hosing the solids off the floor and surrounding equipment,

(Left): When biosolids conveyors were hosed with water, dirty water flowed through openings in the floor to lower level storage wells and areas used for equipment storage, shown here. (Right): Good housekeeping practices eliminated the need for water, and here, the equipment storage area is shown after it was cleaned up – and could remain that way.

sending the water back into the treatment system.

Prior to 2007, operators and contractors shared clean-up responsibilities, putting pressure on limited resources. In 2007, DC-WASA hired a contractor whose sole responsibility was to police and remove all spills daily in the conveying areas of the plant. Over the year, conveying areas improved dramatically in appearance and became much safer to work around. General maintenance and closer inspections also increased, improving and minimizing larger spills and down times.

Benefits went beyond the scope of work. For example, morale improved among workers, who became inspired to maintain cleaner areas once they became that way. While data on productivity was not tracked, anecdotes demonstrate that personnel could focus more on daily tasks and were not distracted by unkempt and potentially unsafe areas.

One key benefit was elimination of a potential health hazard. In the past, the water used to help remove biosolids spills would find its way to lower areas of the facility, resulting in standing water that could cause slips or electrical hazards, and potential insect breeding grounds. In addition, runoff carried detritus to drains, clogging them.

Water was not needed for the fewer, smaller, and less frequent spills common to any such operation. Biosolids are now removed by shovel and sometimes with vacuum services.

Maintenance Improvements Lead to Performance Improvements

Maintenance improved significantly in 2007 when the department began measuring key performance indicators. For example maintenance crews improved availability of critical equipment to 95%, and 90% of project maintenance orders were completed on time. This led to an average of 3.5 of four dewatering trains being available, compared with 1.5 in previous years. This, in turn, contributed to better production consistency. Maintenance and operations staff meet every morning to discuss ongoing issues and plan activities. The Maximo software is used as an asset management tool and to track maintenance on equipment.

Composting Program Increases End-Use Options

As existing operations were improved, new ones were being developed to increase biosolids end-use options, in turn helping ensure business continuity.

Composting to create a Class A product could be used in the Washington metro region and could save as much as $400,000 a year in hauling costs. In 2006, a site was identified on the plant and a pilot project was implemented in 2007. Preliminary indications were that the Washington DC metro market could sustain as much compost as the agency could produce.

In early 2007, staff began a small scale composting demonstration at Blue Plains. Using a portable, in-vessel technology, the trial run of one truck of biosolids and the necessary bulking material (wood chips) nearly filled one vessel. By December 2007, equipment to produce compost was working well and the temperatures were consistent for meeting or

The composting system uses a silage bag as a vessel, with an aeration plenum running down the length of the bag (inside), which is attached to a blower on one end to ensure the composted material remains under aerobic conditions.

surpassing the requirements for Class A Biosolids product (55°C for 3 consecutive days, 40°C for 14 consecutive days). The first bag splits were scheduled for early 2008 and several sites had been identified.

If successful, DC-WASA intends to produce a small amount of compost with this system for use in urban tree planting in the District of Columbia. Staff began discussions with urban forestry officials in the District government about locations where biosolids compost could be used.

Contractors Ensure Sustainable Operations

In 2007, DC-WASA entered into a contract with Urban Service Systems Corporation (USS), which joined existing contractor Recyc Systems Inc. to provide biosolids transportation and land application services. Urban Service's subcontractor, Nutri-Blend Inc., manages its land application responsibilities.

Representatives from DC-WASA and its contractors, including Maryland Environmental Service, were active in Virginia and Maryland to ensure acceptance of biosolids as a safe alternative to chemical fertilizers. Throughout the year, they worked with interested parties on education programs, to address concerns, and to meet with county and state regulators on permit and other issues. MES provides independent inspection services.

McGill Environmental Systems of NC Inc. began constructing a composting facility in Waverly, VA to provide year-round biosolids and other feedstock processing. The facility is expected to provide another option for DC-WASA residuals processing when it begins taking material in 2008.

A state-of-the-art indoor storage facility built by Nutri-Blend will allow all trucks to unload inside and will treat all building air through a biofilter for odor control.

As a result of the Urban Services contract, DC-WASA gained access to a new biosolids storage option, especially during winter months when biosolids sometimes cannot be land-applied. Nutri-Blend built a state-of-the art indoor storage facility in Cumberland County capable of holding about three months of biosolids. This facility will help make biosolids available to farmers when needed most in Spring. The facility was awaiting final approval in December 2007 and was expected to go into operation during 2008.

Communication Outreach Raises the Bar and Gains Input

Communication loops are integral to any business operation. Through its biosolids management program, DC-WASA has ensured that stakeholders with any interest in biosolids have ways to provide input to the agency, are being heard, and in turn receive accurate and complete information about biosolids operations.

Over 2007, Chris Peot, PE, DC-WASA's biosolids division manager, increased his list of stakeholders and interested parties to more than 200 who now get monthly reports on biosolids activities and who are invited to provide feedback on biosolids activities. DC-WASA staff and Maryland Environmental Service also offered several workshops and provided training opportunities on biosolids developments. Staff and MES also communicate with Virginia or Maryland county officials to discuss biosolids-related issues.

Following are highlights of some public outreach conducted in 2007.

Industry Involvement

In addition to working with the individuals DC-WASA staff and representatives contributed to numerous professional meetings by giving presentations on research outcomes, best practices, and potential challenges. Audiences included the local or national meetings of the following organizations:

- Mid-Atlantic Biosolids Association
- Virginia Association of Municipal Wastewater Agencies (VAMWA)
- Association of Metropolitan Water Agencies
- National Association of Clean Water Agencies
- Water Environment Federation

DC-WASA continued its participation in the biosolids outreach and education efforts of the Virginia Biosolids Council (VBC) and at VAMWA. The VBC established a new and more stable organizational structure during the year.

Staff contributed material to a new EPA lime stabilization manual, published in the summer. The EPA pathogen equivalency committee recognized the improvements made at Blue Plains with respect to odor and pathogen minimization, and wished to disseminate this information to others who might benefit from DC-WASA's experience.

Radio Show

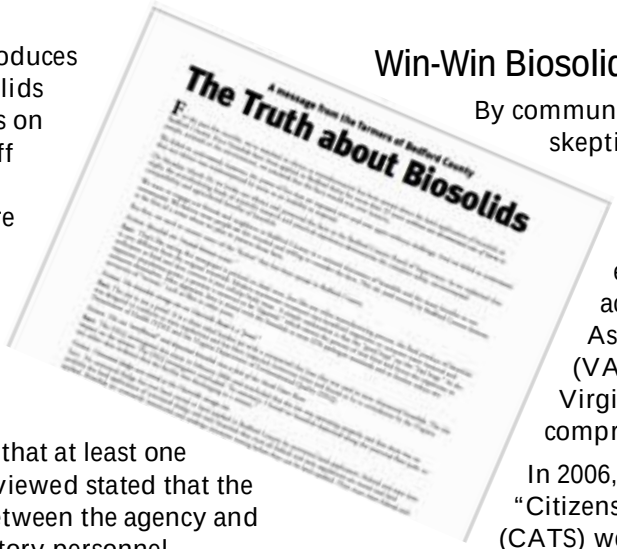
In March, Mr. Peot participated on a panel discussion for the Kojo Nnamdi public radio show on WAMU, which asked: "Where Do Our Waste Products Go?" It stated that "more than eight million tons of sludge -- the muddied, dry substance left behind after sewage is treated -- is produced in the US each year. No one knows exactly how harmful sludge may be, but some activists say it's toxic. We examine how sludge is treated and regulated." Guests also included Robert Hale, Professor of Marine Science in the Department of Environmental and Aquatic Animal Health at the Virginia Institute of Marine Science, College of William and Mary; Laura Orlando, Resource Institute for Low Entropy Systems (RILES). Misconceptions about biosolids were addressed, but unfortunately, very little time was given to correcting the record.

Maryland Environmental Service provides independent monitoring of every site where DC-WASA biosolids are land-applied. Here, MES's Al Razik (left) speaks with an auditor and land-ap contractors at a Virginia field. (2007)

Individual Attention

In May, staff visited an agricultural land application site in Prince Edward County, VA, that included a stop with a concerned citizen to discuss land application of Blue Plains biosolids in the region, the concerns of the family, and the precautions DC-

WASA takes to ensure it produces a high-quality Class B biosolids product. Although no views on the issue were reversed, staff believed it was a valuable opportunity to remain aware of these concerns and take them into account as it strives daily to produce a better product to provide a better service to the farming community.



The audit in October found that at least one "biosolids adversary" interviewed stated that the communication channels between the agency and the public are good. Regulatory personnel interviewed also complimented DC-WASA for its open communication channels and timely responses.

In August, staff presented information about the agency's biosolids program to a group of citizens in Cumberland County, VA, during a meeting organized by the Virginia Department of Health. The focus was renewal of several land application permits and the new storage facility being constructed by Nutri-Blend (see above). Attendees reported that they were impressed by the information.

Staff also manned a biosolids information booth at the Virginia Ag Expo in Charles City, VA, providing another chance to meet with farmers, community members, regulators, contractors, and equipment manufacturers. The 2007 event was held on a farm that has received biosolids for corn and soybean fields for several years.

In November, staff met with other members of the Virginia Biosolids Council and scientists and other representatives from the Chesapeake Bay Foundation to discuss the agency's research program and the potential to recover energy from organic products. The meeting ended with a commitment to continue discussion through 2008.

Win-Win Biosolids Ordinance

By communicating directly with biosolids skeptics and by engaging biosolids advocates, the case for biosolids safety and usefulness can be made. One example of success was with acceptance of a Virginia Association of Counties (VACO) biosolids ordinance in Virginia that reflected a compromise position.

In 2006, a Pennsylvania group called "Citizens Against Toxic Sludge" (CATS) went to Bedford County, Virginia to promote an ordinance to ban biosolids. In the meantime, DC-WASA, contractors, and other biosolids generators, had been working to help develop a model biosolids ordinance that would be acceptable to the public and county administrators throughout the state.

In March and April of 2007, farmers, supervisors, and biosolids opponents had several heated meetings to discuss the CATS ordinance.

In reasoned but passionate local ads and discussions, farmers promoted the benefits of biosolids and told the truth about its safety. They also pointed out that state law trumped county ordinances and the county would likely lose a legal battle.

On May 7, 2007, Bedford County supervisors voted to adopt an acceptable ordinance. Farmers, who were local, known, and trusted, had successfully carried their quiet message to their communities and won a compromise all could live with.

Ag Expo Offers Education

Recyc Systems, one of DC-WASA's biosolids transportation and land-application contractors, participated in the 2007 Virginia Ag Expo, the largest annual field day event held in the state. The expo highlights science-based approaches to farming and includes test crop demonstrations. The Expo is a joint project of the Virginia Corn Growers Association, the Virginia Soybean Association, and the Virginia Cooperative Extension Service.

The Recyc Systems tent is a popular spot at the Virginia Ag Expo, an educational, marketing, and social event that farmers look forward to every year.

Legislative Update

Biosolids Moves to VA DEQ

In 2007, the Virginia General Assembly approved a transfer of authority over biosolids from the Virginia Department of Health to the Virginia Department of Environmental Quality, effective January 2008. DC-WASA staff met with VAMWA biosolids workgroup members and representatives of DEQ to address potential issues and help ensure a smooth transition.

One of the most critical concerns was ensuring there would be enough independent field monitors to oversee the program, and Maryland Environmental Service offered to provide training. In addition, land application contractors were concerned that the permitting process continue without interruption.

Maryland Looks at Regulations

DC-WASA staff were active in a Maryland Department of the Environment (MDE) task force to review proposed new biosolids regulations and provide comments and language for consideration. New regulations were expected to be issued in 2008.

Rapid Response Launched

In 2004, WERF and EPA launched a project to examine reported health effects from biosolids land application, *Methodology for Implementing a Timely Incident Response Mechanism* (03-HHE-5PP), run by the University of North Carolina.

DC-WASA staff participated in the project. Its first phase was to develop a protocol that could be used by existing public health organizations to investigate claims of health effects in a coherent and consistent fashion. Among the challenges is how to gather objective information from those claiming ill effects from land application of biosolids. The protocol was expected to be published in 2008, followed by pilot-testing.

Expert Panel Reviews Biosolids

The 2007 Virginia General Assembly passed House Joint Resolution 694 requesting that the Secretary of Natural Resources and the Secretary of Health and Human Resources convene a panel of experts to study the impact of land application of biosolids on human health and the environment.

The panel comprises scientists, citizen representatives, government agency representatives, and wastewater treatment agency managers, including Chris Peot, PE, of DC-WASA. Over several meetings in 2007, it explored specific questions, such as whether citizen-reported health symptoms are associated with the land application of biosolids, odor impacts, whether there are biosolids-associated contaminants, and if so, whether they might accumulate in food or affect water and wildlife.

Among other tasks, the panel is charged with performing a detailed analysis of the chemical and biological composition of biosolids and its effects, and with evaluating alternative technologies and their costs for biosolids beneficial use.

A final report was due to the state legislature in Fall 2008.

EPA Supports Biosolids Recycling

In a biennial report to Congress submitted in November 2007 on its biosolids activities since 2002, the US EPA reported that eight of 14 biosolids projects had been completed, with research continuing on such issues as microbial and endocrinal risks.

In September 2007, EPA's Administrator signed a final rule that amended EPA's Comprehensive Procurement Guideline (CPG) to expand the definition of "compost" to include compost made from biosolids and manure. EPA also added "fertilizer made from recovered materials" such as biosolids compost as a designated landscaping item.

Once a product is on the CPG, procuring agencies are required to purchase it with the highest recovered material content level practical, given reasonable competition, product price, performance, and availability.

EPA's website, www.epa.gov/cpg/, has information about the agency's Comprehensive Procurement Guideline and related Recovered Materials Advisory Notices (RMANs), which recommend recycled-content levels for CPG items.

Research

Throughout 2007, DC-WASA continued to support several research projects. Following is an update on new and ongoing work.

Endocrine Disruptors

New: **Assessing the Fate of Triclosan and Triclocarban in a WWTP With Emphasis on Sludge Processing and Land Application of Biosolids.** Researchers: Dr. Alba Torrents and Nuria Lozano, University of Maryland; Dr. Clifford Rice, US Department of Agriculture

Triclosan (TCS) and triclocarban (TCC) are organic compounds – often called "emerging organic pollutants" or "endocrine disruptors" – found in consumer products such as hand soap, laundry detergent, toothpaste, deodorants, and plastics. It is believed that discharges from wastewater treatment plants (WWTPs) represent a sizeable portion of their release to the environment.

A significant amount of work has been done on the fate of TCS in WWTPs yet much less is known on the fate of TCC. This research explored whether land application of biosolids is a source of persistent organic pollutants to the environment.

In summer 2007, samples were taken from every process at the Blue Plains AWTP and preliminary results indicated that the main removal process for both compounds in the plant was sorption into the solids, and thus accumulation in the sludge (untreated solids). However the percentages of removal in the Blue Plains AWTP were higher than 95% for both compounds, suggesting some degree of degradation. More sampling was planned to determine where these compounds are removed and the percentage of removal per process.

Results also suggested that TCC is more persistent in the soil than is TCS. Higher concentrations are present with higher applications rates and when the application is most recent. TCS concentrations start decreasing eight months after application while the TCC soil concentrations keep increasing 12 months later. Data were collected from Recyc System Inc. and additional analyses were scheduled for 2008.

New: **Fate of PBDEs Upon Land Application of Biosolids.** Research conducted by University of Maryland and U.S. Department of Agriculture. Researcher: Natasha Andrade

Polybrominated diphenyl ethers (PBDEs), used as fire retardants in a variety of materials, have emerged as a significant environmental contaminant. Evidence of environmental contamination by PBDEs has been noted in Europe and Asia for more than ten years. The three tasks in the study look at the environmental fate of PBDEs after land application. Task 1: Determine the presence and temporal trends of PBDE's in Blue Plains Biosolids. Task 2: Survey levels of PBDEs in commercial farms that have received biosolids. Task 3: Conduct a control study to determine the fate PBDEs after application of biosolids.

Drought Resistance

Ongoing: **Effects of Auxin-Boosted Biosolids on Grass Drought Resistance: Refining Our Understanding of the Mechanism.** Researchers: Drs. Erik Ervin and Greg Evanylo, Virginia Tech

Researchers continued work on documented potential for crop plants grown in soil amended with biosolids to exhibit greater tolerance to drought and other forms of stress because of the levels of plant biostimulants or related products found in the biosolids.

Detailed analysis of various types of biosolids has confirmed that they contain substances such as vitamins, hormones, humic acids, and amino acids that are important as plant growth regulators or as feedstock that microbes can turn into such regulators.

Researchers have found that microorganisms in the wastewater treatment process break down proteins into amino acids. One such amino acid, tryptophan, breaks down further to an auxin: indole acetic acid. Auxins are 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.

Research shows that plants grown in biosolids-amended soil contain higher levels of plant growth regulators than plants grown in soil without biosolids. In some circumstances, plants grown in the soil with biosolids have more resistance to drought.

Researchers planned to test their theory in a field trial in 2008, in which they would grow corn with and without biosolids and document the effects of plant growth regulators.

Forest and Tree Farm Applications

Ongoing: **Tree Growth Response, Nutrient Dynamics, and Water Quality Following Land Application of Biosolids to Forests in Virginia.** Researchers: Dr. Thomas R. Fox, Eduardo C. Arellano, and Aaron Pratt, Virginia Tech

Researchers studied 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 and measured 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.

Nitrogen availability increased after biosolids and conventional fertilizer applications. Results from this study indicate that biosolids, applied at low rates, may be a good alternative as a source of nutrients.

Ongoing: Application of Deep-Row Biosolids Incorporation for Production of Hybrid Poplar in Virginia Coastal Plain Mineland Reclamation Sites. Researcher: Dr. Greg Evanylo, Virginia Tech.

This study looks at whether hybrid poplars can assimilate high amounts of deep-row-incorporated (entrenched) biosolids-applied nitrogen and phosphorus with no detrimental impact of N, P, or of heavy metal leaching during reclamation of coarse-textured soils.

Research at the site showed little evidence of nutrient loss, whether nitrogen or phosphorus. In the first year of results from the Virginia Tech project, researchers did see evidence of some nitrogen leaching. However, the amounts lost were at or below the levels of nitrogen loss experienced under typical agronomic practices for growing corn. Significant loss of phosphorus was not observed.

Recyc Systems president and owner Steve Foushee delivers biosolids to Willie Fox, a dairy farmer in Fauquier and Culpepper counties, VA. Researchers are studying biosolids benefits for farmers, who rely on them to fertilize crops.

Transport of heavy metals was undetectable for most of the metals studied. Where detectable, metals were largely transported in particulate phase.

With time, transport of Ba, Cd, Ni, Pb, Fe and Mn was increased under some of the biosolids treatments.

Odor Studies

New: Multiobjective Optimization Models for Distributing Biosolids to Reuse Fields. Researchers: Dr. Steven A. Gabriel and Prawat Sahakij, University of Maryland

This research was aimed at minimizing biosolids odor by assessing models for tradeoffs between biosolids odor and their treatment and distribution costs. Biosolids managers can then use optimal wastewater treatment and biosolids distribution strategies associated with these tradeoffs to produce the least odorous biosolids at minimal cost.

Typical daily variables studied included the amount of lime used at DC-WASA, the percent of flow from the blend tank to the on-site contractor, and the amount of biosolids applied to each field site by specific contractors, among others.

Preliminary results indicated that taking a step away from one of the optimal solutions to improve one of the objectives worsened the other objective. But when the belt filter presses and centrifuges were being used at full capacity and in good working order, there was maximum odor reduction. There was a 60% odor reduction over a single month at a cost of about $35,000 more. Further work was planned, with a final report due in mid-2008.

Ongoing: Managing Odorous Biosolids Using Statistical Odor Predicting Models. Researcher: Dr. Steven A. Gabriel, University of Maryland

This study is looking at practical statistical models for predicting biosolids odors using existing data. Three tasks include 1) developing biosolids odor-predicting models for the wastewater treatment plant using data from the Blue Plains facility including temperature; 2) developing biosolids odor models at field sites that include analyzing the impact of field conditions, inspector odor sensitivity, and original odor at Blue Plains; and 3) conducting a simulation and sensitivity analysis to produce probability distributions for biosolids odors based on distributions from explanatory factors. The final two tasks were expected to be completed in 2008.

Other Research Funded or Supported by DC-WASA

Researchers at Penn State University developed a formula for **translating levels of water-extractable phosphorus in individual biosolids into source coefficients** ("P-source coefficients") that could be used in the various phosphorus site indexes in the mid-Atlantic region.

Research findings in a 2006 Water Environment Research Foundation study, *Fecal Regrowth and Reactivation*, detailed the **regrowth of fecal bacteria after undergoing certain types of plant processes.** The study looked at digested product and combinations of dewatering technology. Blue Plains' biosolids does not exhibit the phenomenon. DC-WASA staff served as co-principle investigators and project advisors. DC-WASA staff have continued to monitor studies and other outcomes from the report, especially as it considers upgrading its facility to include digestion.

Progress Toward Goals

In 2007, the Biosolids Workgroup revised its goal-setting process and action plans to add or modify them as circumstances change. The group, with input gained from stakeholders throughout the year, develops overall goals and associated action plans in the first quarter of each year. These are maintained on a spreadsheet that is reviewed at least quarterly to ensure that the milestones identified in the action plan are on target.

2007 Goals		Progress (as of December 2007)
1. Sustained regulatory compliance		
1.1 Dec 07	Reduce the number of odor incidents in the field by 50%. *Polymer dosage, sludge blending, and pH levels are among factors that affect odors.*	Completed: A means of communicating changes in polymer to operators was developed. Discussion with operators and process engineers resulted in a new process control strategy to plan for sludge age, blend ratios, and thickener performance. Slightly behind schedule: An early-warning infrared sensor to monitor pH levels was to go online in 2008.
1.2 Dec 07	Reduce the number of low pH trucks leaving the plant by 50%. *Because biosolids temperature is an indicator of low pH, an alarm to test for it can help monitor pH levels.*	Slightly behind schedule: An alarm test SOP for an infrared temperature feedback system was completed and work remained on linking the alarm to infrared sensors. Behind schedule: A thermocouple backup system was being reviewed.
2. Improved biosolids quality management		
2.1 Dec 07	Conduct a minimum of two research projects designed to improve biosolids quality. *Implementing results can be critical to process improvements.*	On target: Several research projects were launched, and multi-year projects continued to be supported. (See Research section of this report for more information.)
2.2 Dec 07	Reduce truck loading time during rush hour by 20%. *This can reduce CO_2 equivalents through less idle time and can improve biosolids delivery.*	Completed: All four cranes were in consistent operation by ensuring maintenance schedules were met. Slightly behind schedule: New silo operations that could allow for self-loading had unresolved issues. Behind schedule: Off-hour propping for trucks awaited new silo operations.
2.3.1 Dec 07	Coordinate at least 2 meetings with operators and maintenance to identify biosolids reduction targets, maintenance improvement opportunities.	Completed: After an assessment, operators determined that benchmarking had less to do with blanket depth to reduce odors than thought. Discussion with operators resulted in significant improvements in centrifuge performance. Additives for enhancing dewatering operations were considered but rejected as not beneficial. Maintenance staff attended BWG monthly meetings.
2.4 Dec 07	Continue verification of NBP EMS annually. *The EMS has proven to be essential to helping the biosolids program thrive, and auditing keeps it dynamic.*	Completed: An internal audit schedule was developed and implemented. On target: Audit results were reviewed and an implementation plan begun (to be completed in 2008).
2.5 Dec 07	Calculate and track pretreatment effects in reducing pollutants from biosolids. *Stakeholders are concerned about pollutants.*	Completed: A list of industrial dischargers sorted by category and flow was developed. On target: Information was included in presentations and sent to stakeholders, and more work was planned for 2008.
2.6 Dec 07	Achieve at least one new program diversification project. *Business continuity depends on having a market for biosolids in the future.*	Completed: Maryland Environmental Service provides monthly tonnage to calculate greenhouse gases. On target: A draft biosolids management plan with and w/o digestion and drying options for implementation by 2012 was developed. The Urban Services storage facility was built and permitting was expected in 2008. Behind Schedule: A compost project was started and a market developed, but bags were not split for distribution, planned for 2008.
3. Expanded relations with interested parties		
3.1 Dec 07	Increase interested party list by 25%. *This requires that biosolids managers and staff make sure they are constantly in touch with public concerns.*	Completed: Biosolids managers and representatives contact county officials at least once a week, and meet with them at VACo and other venues. The list of interested parties receiving monthly information has risen by more than 25% to more than 200.
3.2 Jun 08	Increase VBC web site participation by 25%. *The Virginia Biosolids Council, funded by biosolids generators and contractors, plays a significant role in educating the public and farmers about biosolids.*	Completed: The VBC was charged with tracking use of its website and found that visits increased by 11% and hits by 29% over the first seven months of 2007 compared with 2006. It also developed at least two stakeholder outreach sessions in its 2008 work program.
3.3 Jun 08	Receive all complaint information within 30 days of incident. *It is important to be responsive to public concerns in timely manner.*	On target: DC-WASA and MES worked with VDH to make sure complaint information made its way to DC-WASA and similar plans were underway with VA-DEQ. A system for putting more field information into a database was created and the data reviewed routinely.
3.4 Dec 07	Disseminate results for all completed research to interested parties by end of FY. *This information can help the public gain an accurate understanding of biosolids.*	On target: Summaries from the first set of reports were posted on the DC-WASA website and included in the annual report. It was decided that the VBC newsletter did not need to include these. Behind schedule: Semi-annual reports from researchers with fact sheets still needed to be completed and were planned for early 2008.
3.5.1 Dec 08	New goal (b/c of DEQ transition): Assist with efforts to increase local monitor coverage in Virginia. *MES has excellent training programs.*	On target: MES held at least one inspector-training program for Virginia monitors. Behind schedule: Internal inspection manuals were being updated so they could be provide given to the VBC for its website and made available to monitors.
4. Improved/innovative environmental performance		
4.1 Sep 07	Calculate the environmental benefits of reduced trucking.	Completed: Truck miles were calculated, including pollution reduction and solids data.
4.2 Dec 07	Monitor full compliance with nutrient management planning.	On target: MES staff were conducting spot-checks of nutrient management plans to prepare for expected new regulations.
4.3 Dec 07	Calculate biosolids program greenhouse gas (GHG) balance by end of FY.	On target: GHG calculations for new composting operations were completed and verified with academic sources. Behind schedule: Greenhouse gas savings from the ERCO tree-farming site were being calculated but expected in 2008.

2008 Outlook

Challenges Expected in 2008

- Regulatory changes may require operational adjustments.
- Research findings may require unexpected process modifications.
- Water/sewer upgrade costs may compete for biosolids budget dollars.
- Population growth may increase biosolids production and operational demands.
- Misinformation in media and by biosolids opponents may erode public acceptance of biosolids.
- Hauling costs may rise with rising gas prices.

Improvements Planned for 2008

- Flexibility is being built into the new facilities plan that may include thermophylic digestion and drying, and use of methane gas production for energy needs.
- More consistent and higher solids content is expected to reduce hauling costs.
- More processes will be automated, including data reporting so that it can be evaluated more easily for trends and root-causes.
- Incident reporting will be streamlined and further computerized.
- Internal collaboration will continue to improve as the environmental management system expands beyond biosolids processes.
- Targeted training will reach to more staff and contractors.
- Research results will be assessed for practical applications and disseminated more understandably to the public.
- More end-use options for biosolids will be explored.
- Further collaborating with regulators and farmers will help with biosolids end-use successes.
- Collaboration with other biosolids generators and their contractors will help with responding to incidents and with educating the public about the value of biosolids.

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.