Office of Inspector General

Status Report

Land Application of Biosolids

2002-S-000004

March 28, 2002

Inspector General Resource Center Conducting the Review	**Headquarters Audit/Evaluation Resource Center Washington, DC**
Program Offices Involved	**Office of Water**
	Office of Research and Development
	Office of Enforcement and Compliance Assurance

Abbreviations

DMT:	Dry Metric Ton
EMS:	Environmental Management System
EPA:	U.S. Environmental Protection Agency
EQ:	Exceptional Quality
FTE:	Full-Time Equivalent
OECA:	Office of Enforcement and Compliance Assurance
OIG:	Office of Inspector General
STP:	Sewage Treatment Plant
WEF:	Water Environment Federation
WERF:	Water Environment Research Foundation

Front Cover Photograph: Biosolids being applied to land. Photograph by OIG staff.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

OFFICE OF
INSPECTOR GENERAL

March 28, 2002

MEMORANDUM

SUBJECT: Status Report: Land Application of Biosolids
Report No. 2002-S-000004

FROM: Judith J. Vanderhoef, Project Manager
Headquarters Audit/Evaluation Resource Center (2443)

TO: G. Tracy Mehan, III
Assistant Administrator for Water (4101M)

Sylvia K. Lowrance
Acting Assistant Administrator
for Enforcement and Compliance Assurance (2201A)

Henry L. Longest, II
Acting Assistant Administrator
for Research and Development (8101R)

Attached is a status report on land application of biosolids. This report provides biosolids program information relating to EPA and State staff, State delegation, land application data for seven States, responding to and tracking health complaints, risk assessment and pathogen testing concerns, EPA's relationship with the Water Environment Federation, and public acceptance concerns. The report is based, in part, on work we did in response to an allegation citing numerous problems with the biosolids program.

Because this is a status report that does not contain recommendations, a written response is not required, and this report is considered closed upon issuance in our automated tracking system. If you have questions or comments about the report, please contact me at (202) 260-5471 or Virginia Roll at (202) 260-5101.

We greatly appreciate the cooperation we received from your staffs during our review and the opportunity to attend two excellent conference/workshops co-sponsored by EPA.

Attachment

Executive Summary

Introduction

Sewage sludge is the solid, semi-solid, or liquid by-product generated during the treatment of wastewater at sewage treatment plants. According to the U.S. Environmental Protection Agency (EPA), over half the sludge produced each year is "used beneficially," primarily on agricultural land. The treated sewage sludge used in land application is called "biosolids" by EPA and the industry.

Land application of biosolids is a controversial issue. Concerns have been expressed about potentially adverse impacts of biosolids on human health and the environment as well as quality of life for nearby residents. However, EPA has taken the position that the biosolids program is low-risk and low-priority.

Purpose

In March 2001, the National Whistleblower Center submitted a series of allegations to the EPA Office of the Inspector General (OIG) concerning EPA's conduct in regard to regulating biosolids. The allegations by the Center were based largely on issues raised by an EPA research scientist. In addition, a previous OIG audit on biosolids, issued in March 2000, found inadequacies in EPA's management and enforcement of the biosolids program. For these reasons, we are providing a status report on land application of biosolids. The specific issues we examined, as well as the status of each, are summarized below.

Status of Issues

EPA and State Biosolids Program Staff. Some State officials have expressed concerns that EPA is not dedicating sufficient staffing and financial resources to the program. Nonetheless, EPA continues to place a low priority on the program, and staff assigned to the biosolids program have been declining. For example, at the Regional level, EPA had dedicated 18 full-time equivalent (FTE) positions to biosolids in 1998 but only 10 FTEs in 2000. At the State level, staff assigned to biosolids vary significantly, with nearly half of the States dedicating one or fewer FTEs to biosolids. EPA's position is that the resources allocated to the biosolids program are appropriate when balanced against competing priorities.

Delegation of the Biosolids Program to the States. The Clean Water Act gives EPA authority to delegate the biosolids program to States, but little progress has been made thus far. Only five States have received formal delegation from EPA for the biosolids program. Given EPA's lack of resources devoted to the Federal program, EPA cannot be certain that all citizens in non-delegated States are provided at least the same level of protection as in the Federal program.

Extent to Which Biosolids Are Land Applied in Seven States. There can be a wide variation in how States manage biosolids. For seven States from which we received information, we noted significant differences in their sludge management practices. For example, one State land applied only 10 percent of the biosolids it generated, while another land applied over 80 percent of the biosolids it generated.

Responding to and Tracking Health Complaints. The National Whistleblower Center sent us a list of 21 complaints related to sludge exposure and contended EPA failed to investigate any of the cases. Of the 21 cases, we determined that EPA and/or a State agency investigated 14. For the remaining seven complaints, EPA and State officials indicated five were not reported to them, and the remaining two involved non-sludge composting facilities and thus were not biosolids related. Regarding tracking, EPA had no formal process.

Risk Assessment and Pathogen Testing Concerns. Discussions about whether research is needed to address risk assessment uncertainties and pathogen issues regarding the safety of land application of biosolids have contributed to the controversy regarding biosolids. EPA does not plan to complete a comprehensive evaluation and monitoring study to address risk assessment uncertainties. In addition, there are indications that more research on pathogen testing is needed.

EPA's Relationship with a Professional Association. The National Whistleblower Center expressed concern about EPA's support of the Water Environment Federation, a professional association. However, of the $12.9 million EPA provided over a 3-year period to the Water Environment Federation and a research organization the Federation created, 96 percent of that amount ($12.4 million) had been Congressionally mandated and EPA had no discretion in awarding these funds.

Public Acceptance Concerns. Despite Federal regulatory safeguards, public acceptance of land application of biosolids has been mixed and public scrutiny of the practice continues. There are public concerns regarding the impact of biosolid land application on health, quality of life, and natural resources. These concerns have led a number of counties and municipalities to ban or restrict the land application of biosolids. Public perception regarding biosolids land application can have a significant impact on the implementation of the program.

Agency Comments

Although this status report does not contain any recommendations, EPA's Office of Water provided comments to the draft of our report. Those comments are included as Appendix C. We have incorporated their recommended changes as appropriate.

Table of Contents

Introduction

Production of sewage sludge has increased in this country as a result of more stringent wastewater treatment requirements and a growing population. Sewage sludge is the solid, semi-solid, or liquid by-product generated during the treatment of wastewater at sewage treatment plants. The Environmental Protection Agency (EPA) estimates that more than seven million dry metric tons (DMTs) of sewage sludge are produced annually. According to EPA, over half the sludge produced (54 percent) is "used beneficially," that is, applied on agricultural, horticultural, forest, and reclamation land throughout the country. The treated sewage sludge product used in land application is called "biosolids" by EPA and the industry.

Purpose

In March 2001, the National Whistleblower Center, a non-governmental organization, submitted a series of allegations to the EPA Office of the Inspector General (OIG) concerning EPA's "conduct in regard to regulating the dumping of waste products generated by sewage treatment plants...." The allegations by the Center were based largely on issues raised by an EPA research scientist. Other interested stakeholders have also raised concerns about land application.
In addition, a previous OIG audit on biosolids, issued in March 2000, found inadequacies in EPA's management and enforcement of the biosolids program which, to date, have not been resolved. For these reasons, we are providing a status report on land application of biosolids. This report does not include findings and recommendations and is neither an audit nor an evaluation. It will describe the following issues relating to biosolids:

- EPA and State biosolids program staff.
- Delegation of the biosolids program to the States.
- Extent to which biosolids are land applied in seven States.
- Responding to and tracking health complaints.
- Risk assessment and pathogen testing concerns.
- EPA's relationship with a professional association.
- Public acceptance concerns.

Background

Congress gave EPA broad authority to deal with water pollution when it enacted the Clean Water Act (the Act) in 1972. The Act's goal is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Under this mandate, EPA has developed a variety of regulations and programs to reduce pollutants entering all surface waters, including lakes, rivers, estuaries, oceans, and wetlands. For example, in order to discharge pollutants into the waters of the

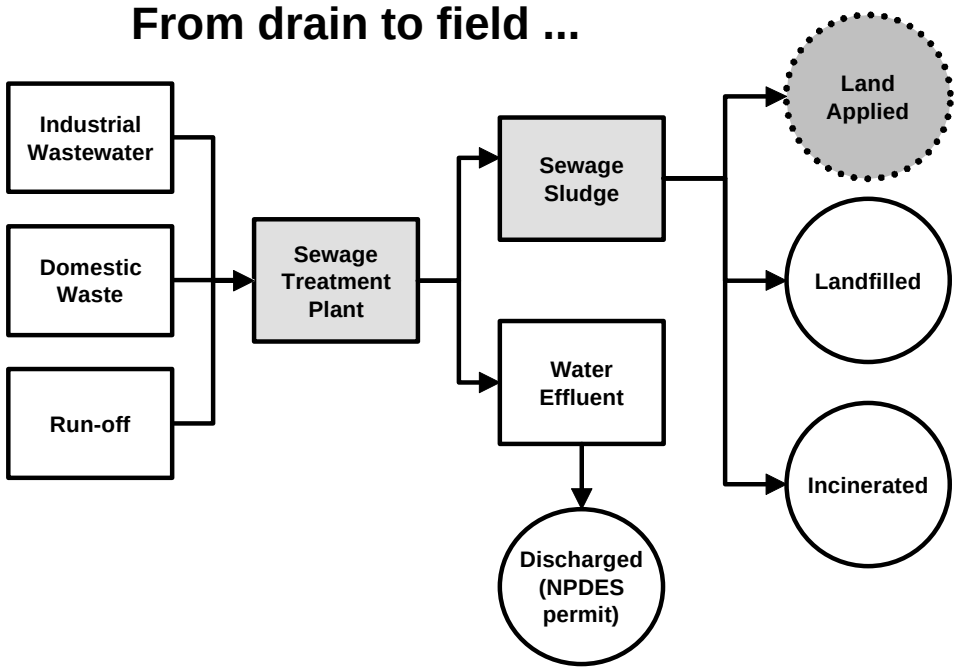
United States, a facility such as a sewage treatment plant must obtain a permit from EPA or a State. The permit, issued under the National Pollutant Discharge Elimination System, establishes the amount of each pollutant a plant may discharge.

The Act's requirements for more effective removal of pollutants from wastewater have resulted in the production of large quantities of sewage sludge. Because sewage sludge may contain toxic pollutants and disease-causing organisms, failure to properly manage sewage sludge may have adverse effects on human health and the environment.

When Congress amended section 405 of the Act in 1987, it required EPA to develop a comprehensive program to reduce environmental risks and maximize the beneficial use of sewage sludge. In February 1993, EPA promulgated Title 40, Code of Federal Regulations, Part 503, "Standards for the Use or Disposal of Sewage Sludge." (This report will refer to these standards as the "Sludge Rule" or "Rule.")

The Rule establishes requirements for use or disposal of sewage sludge in three circumstances: land application, disposal in landfills, and incineration (see Figure 1). Land application of biosolids involves spraying or spreading the material on the surface of the land, injecting it below the surface, or incorporating it into the soil. The Rule's Preamble states that sewage sludge is a "valuable resource" due to its fertilizer and soil conditioner properties. However, due to concerns about the safety of the practice, land application of biosolids can be controversial.

Figure 1



The standards for each use or disposal method consist of general requirements, numerical limits on the pollutant concentrations in sewage sludge, management practices, and operational requirements. The Sludge Rule also includes monitoring, record keeping, and reporting requirements. With regard to land application, the requirements primarily depend on the quality of the biosolids. The characteristics which determine biosolids quality are the level of pollutants (metals) in the biosolids; the presence or absence of pathogens (disease-causing organisms); and the degree of attractiveness to vectors (disease-carrying animals and insects such as rodents, birds, and flies). In addition, the Rule distinguishes between two classes of pathogen reduction in biosolids:

- **Class A:** The Rule requires that pathogens in these biosolids be reduced to below detectable levels. Within Class A, Exceptional Quality (EQ) biosolids meet the Rule's most stringent metals limits. The Rule places no restrictions on the land application of EQ biosolids, but it does place restrictions on Class A biosolids that do not meet the stringent metals limits.

- **Class B:** The Rule requires that pathogens be significantly reduced but not below detectable levels for Class B biosolids and sets site restrictions and farm management practices to be used when applying such biosolids.

A great deal of attention has been focused on land application of biosolids. In March 2000, a Congressional hearing was held on EPA's Sludge Rule. Also, various municipalities and counties have instituted land application bans. For example, several California counties recently banned Class B biosolids land application. Further, national and local media and at least one environmental group have reported on the issue of land application.

Prior Audit Coverage

The General Accounting Office issued a report in March 1990, *Water Pollution: Serious Problems Confront Emerging Municipal Sludge Management Program* (GAO/RCED-90-57). The report was issued before the final Sludge Rule was promulgated. This report identified potential problems for the implementation of a national biosolids program, including the possibility of continued low State participation, the probability of inadequate resources, and the need for development of an effective enforcement program.

An EPA OIG audit report, *Biosolids Management and Enforcement*, issued in March 2000 (No. 2000-P-10), disclosed that EPA does not have an effective program for ensuring compliance with the land application requirements of the Sludge Rule. Some of the points the report noted were:

- In fiscal 1998, EPA reviewed only about 38 percent of the annual reports submitted by sewage treatment plants.

- EPA performed few biosolids-related inspections of sewage treatment plant operations, virtually no inspections of land application sites, and few record inspections of treatment plants or land appliers.

- The biosolids program had been delegated to only three States,[1] and there was virtually no Federal oversight of State biosolids programs in nondelegated States.

The report concluded that the almost complete absence of a Federal presence in the biosolids program was a result of the low priority given to biosolids management by EPA's Office of Water and the decision of EPA's Office of Enforcement and Compliance Assurance not to commit resources to biosolids.

Scope and Methodology

For this review we focused on land application; we did not address landfill disposal and incineration of sludge. Where we discuss State biosolids issues, we did not evaluate the adequacy of State programs. We began our field work in May 2001 and completed it in September 2001.

We spoke to or examined information from various industry representatives, including one of the nation's large land application companies; State officials; private citizens; environmental groups; university scientists; and representatives of EPA and other Federal organizations. We attended the joint EPA/U.S. Department of Agriculture *Workshop on Emerging Infectious Disease Agents and Issues Associated with Animal Manures, Biosolids and Other Similar By-Products*, held June 4-6, 2001, in Cincinnati, Ohio. We also attended the third annual *National Biosolids Conference/Workshop*, held June 25-28, 2001, in Potomac, Maryland. In addition, we toured a local wastewater treatment plant and interviewed officials responsible for plant operations.

We took into account the prior OIG audit on EPA's biosolids program (see "Prior Audit Coverage" section). Further details on our scope and methodology are in the body of the report and Appendix A.

[1]Two additional States have obtained delegation since our prior report. See Table 3.

EPA and State Biosolids Program Staff

Some State officials have expressed concerns that EPA does not consider the biosolids program a priority and is not dedicating sufficient staffing and financial resources to the program. Despite State concerns, EPA continues to place a low priority on the program, and staff assigned to the biosolids program have declined in recent years. In addition, staff assigned to biosolids programs by the States vary significantly, with nearly half of the States dedicating one or fewer full-time equivalent (FTE) positions to biosolids. EPA's position, as expressed in responses to our prior report, is that: (1) EPA's financial resources are limited; (2) the level of resources allocated to the biosolids program is appropriate when balanced against competing priorities; and (3) many States have excellent oversight programs.

EPA Resources

The responsibility for EPA's biosolids program is spread among 4 EPA Headquarters program offices (see Table 1) and the 10 Regional offices. Collectively these program and Regional offices perform activities designed to: (1) maintain strong science and risk assessment; (2) set, enforce, and revise standards; (3) support State and local decision-making; (4) ensure appropriate incident response; and (5) improve the quality and accessibility of information.

Office of Water officials estimated that Headquarters program offices devoted less than six FTEs to managing biosolids in fiscal year 2000:

Table 1:
Biosolids Staff in EPA Headquarters Offices

EPA Office	Biosolids FTEs
Office of Water	4.0
Office of Research and Development	1.6
Office of General Counsel	0.2
Office of Enforcement and Compliance Assurance	0.0
Total	5.8

As can be seen from the table, the Office of Water provides the majority of the Headquarters FTEs managing the biosolids program, while the Office of Enforcement and Compliance Assurance (OECA) provides none, even though it

has program responsibilities. As we explained in our prior report, that office has disinvested from the biosolids program.

EPA Regional Coordinators informed us that among the 10 Regional offices, approximately 10 FTEs were dedicated to managing biosolids in fiscal 2000. However, our prior audit noted that the Regions had dedicated approximately 18 FTEs in fiscal year 1998 to managing biosolids. Thus, in 2 years, there was a significant drop in the Regional staffing levels for this program. (Because the prior report concentrated on the Regions, we were not able to compare the fiscal 2000 levels for Headquarters personnel with fiscal 1998 levels.) Further, our review of EPA Regional FTEs dedicated to enforcement of the Sludge Rule showed that the FTEs declined from slightly more than seven in fiscal year 1998, to slightly less than four in fiscal year 2000. These numbers are shown in Table 2.

Table 2:
Regional Biosolids FTEs

Year	Total FTEs	Enforcement FTEs
1998	18	7
2000	10	4

At the 2001 National Biosolids Conference in Potomac, Maryland, there were presentations and discussions of biosolids-related issues and program concerns. Four EPA Regional staff expressed the following concerns about resource levels for biosolids programs:

- *There are two people for eight States. Reviewing more than 700 annual reports per year is impossible.*
- *Low environmental risk makes it hard to get resources.*
- *100 percent of my time is spent on biosolids, mostly enforcement and compliance assistance. It is not enough. OECA should invest in biosolids.*
- *We used to have three or four people for biosolids enforcement; now we have one.*

State Resources

Because EPA has assigned a low priority to the biosolids program, the burden of ensuring that biosolids are managed effectively falls to the States. In response to our previous report on biosolids, which was critical of EPA for having insufficient resources dedicated to the biosolids program, key EPA officials indicated they believed the States were adequately addressing biosolids program needs. In a February 2000 response to the draft of our prior audit, the then Assistant

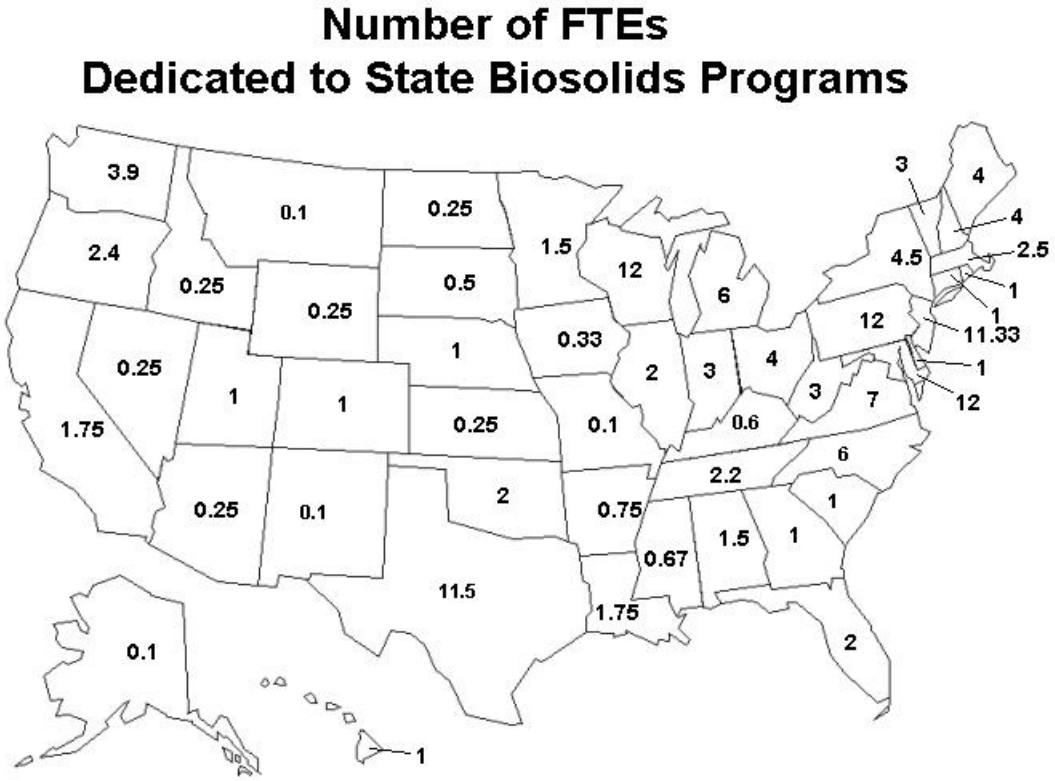
Administrator for the Office of Water stated, "a program for regulation, compliance oversight, and enforcement of biosolids use and disposal exists in every State." Further, in June 2001, the then Acting Assistant Administrator for the Office of Water stated in response to the final version of our prior report that, "Many States have excellent oversight programs."

However, comments from State Biosolids Coordinators at the 2001 National Biosolids Conference indicated that biosolids program staffing levels may not be adequate:

- *How do we run our program with fewer resources and deal with septage, delegation, pollutants of concern, odors, rising energy costs, and composting?*
- *There remains a critical lack of resources at both the State and Federal levels.*
- *We don't have the resources to find out causes of problems.*
- *Is there any way to obtain more resources?*

In addition, data on State staffing provided by State Biosolids Coordinators suggest that many States' biosolids programs may not be adequately staffed. As can be seen from the following map, State staffing varies significantly.

Figure 2



Nationwide, there are 140.33 FTEs assigned to State biosolids programs. While this averages out to almost 3 FTEs per State (2.81), in fact, this is not how biosolids staff are generally distributed. Nearly half of the States (24) have one or fewer FTEs, while 5 States have 42 percent of all of the FTEs. Those 5 -- Texas, Wisconsin, Pennsylvania, Maryland, and New Jersey -- have between 11 and 12 FTEs each, for a total of 58.83.

In our previous report we said that, "EPA cannot assure the public that current land application practices are protective of human health and the environment." Given the almost 50-percent reduction in EPA enforcement resources and the number of States with one or fewer FTEs devoted to biosolids, we believe this conclusion is equally valid today.

Concerns of State Biosolids Coordinators

Several State officials stated that EPA is not sufficiently committed to the biosolids program. At the 2001 National Biosolids Conference, various State Coordinators expressed their concerns.

- *EPA needs a true goal with staffing and financial directives.*
- *EPA resources are going into TMDLs[2] -- not to biosolids.*

A third State official noted that it took a cryptosporidium outbreak to get dollars shifted to drinking water research. Related to this issue, another State official opined that a similar outbreak involving land-applied biosolids would probably result in the abolishing of land application rather than research; however, this official believed that the States would probably get out of land application before such a crisis actually occurred.

Further, State Biosolids Coordinators have expressed concerns regarding EPA's shift from advocacy of land application to a neutral position, without any written explanation. According to Office of Water senior managers, EPA used to be proactive in promoting biosolids land application because it is consistent with recycling. However, a recent Assistant Administrator decided the Agency should instead be method-neutral; i.e., regulators should not be promoters of any one of the management methods over another described in the Sludge Rule. While some Office of Water senior managers said they did not see the shift as a major change, some State coordinators believed otherwise.

In addition, on various occasions dating back to 1998, the Wisconsin State Biosolids Coordinator, who said he had broad State consensus, expressed concerns directly to senior EPA officials. In an October 1998 letter, the

[2] The TMDL (Total Maximum Daily Load) Program involves calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards under the Clean Water Act.

representative urged EPA to financially support biosolids research and development, as well as the Pathogen Equivalency Committee.[3] The representative also requested that EPA have a dedicated Biosolids Coordinator in every Region to maintain oversight of the entire program.

Almost 3 years later, in September 2001, the Wisconsin State Biosolids Coordinator wrote to the EPA Administrator about biosolids management. He requested that, "the biosolids program within EPA be granted additional funding and personnel to effectively implement this overburdened program." As support for this request he pointed out:

> *Only about $4 million (of EPA's FY 2001 budget) ... was devoted to biosolids staff and the program .... At the same time approximately 40% of the cost of wastewater treatment is expended on sludge treatment and management. This inequity has far-reaching consequences and places beneficial use in severe jeopardy.*

His letter cited a series of events he believed should force the Agency to reconsider the low priority rating given to biosolids and reallocate resources and staff to the program. His letter concluded with recommendations for immediate action, including: increasing staffing levels within EPA for the biosolids program; funding the Pathogen Equivalency Committee; and making funds available to States for elevating their biosolids programs.

The Wisconsin State Biosolids Coordinator presented the Opening Comments at the 2001 National Biosolids Conference, and continued to express concern about EPA's biosolids program:

> *As you may recall at last [year's meeting], a warning cry was raised that the viability of land application of biosolids would be in jeopardy if more resources and oversight were not directed to the program.... A year later, regulatory oversight and program implementation remain critical issues and the long-term viability of beneficial reuse remains hanging in the balance.... There remains a critical lack of resources at both the state and federal level and dwindling staff at the federal level. The biosolids program continues to receive a very low priority rating within EPA.*

[3] The Committee is comprised of EPA experts who review pathogen and vector attraction reduction processes and provide guidance and recommendations to the regulated community and permitting authority on whether the proposed processes are equivalent to processes in the Rule.

EPA Position on Resources

EPA Headquarters officials attending the conference acknowledged that resource needs expressed by EPA Region and State personnel would not be met. The Director of the EPA Office of Wastewater Management noted that the biosolids program is competing for funding with many other water and wastewater infrastructure demands, and he does not expect additional funding to be available for biosolids efforts.

This was confirmed in a January 2002 response to our prior audit. The response, from the Assistant Administrator for Water and the Acting Assistant Administrator for Enforcement and Compliance Assurance, stated:

> *Implementation of most, if not all, of the recommendations ... would require additional resources in terms of people and dollars which are simply not available. We have only finite resources to support a large number of responsibilities to address risks to the nation's water resources ... we believe the level of resources currently allocated to the biosolids program is appropriate when balanced against competing priorities.*

Delegation of the Biosolids Program to the States

Section 405 of the Clean Water Act gives EPA the authority to delegate the biosolids program to the States, but little progress has been made thus far. Because only five States have received formal delegation from EPA for the biosolids program, and EPA devotes few resources to the program, there has been minimal implementation of the Federal biosolids program.

EPA has had more success in delegating other environmental programs. For example, EPA has delegated primary responsibility for the Underground Injection Control program to 34 States, and shares program responsibilities with 6 other States. Primary responsibility for the hazardous waste base program under the Resource Conservation and Recovery Act has been delegated to 48 States, the District of Columbia, and Guam.

Before a State can apply for delegation of the biosolids program, it must have laws and regulations equivalent to the Federal requirements. These State laws and regulations must include authority to: regulate all sewage sludge management activities subject to the Sludge Rule, unless the State is applying for partial delegation; issue permits; regulate use or disposal of sewage sludge by non-permittees; require and ensure compliance; abate violations; and take actions to protect public health and the environment.

Obtaining biosolids program delegation can be a lengthy process. The five States that obtained delegation, as well as the time frames, follow:

Table 3:
Approval Time Frames for Delegated States

State	Application Date	Approval Date	Days To Process
Oklahoma	6/10/96	11/19/96	162
South Dakota	8/12/98	10/22/01	1167
Texas	2/5/98	9/14/98	221
Utah	10/10/95	6/14/96	248
Wisconsin	3/8/99	7/28/00	508

According to Office of Water officials, as many as 17 States may be seeking delegation of the biosolids program. A reason given by State officials for seeking delegation is that membrs of the regulated community prefer to interact with the State rather than EPA.

The remaining States are not currently seeking biosolids program delegation, and some have indicated they do not plan to do so. Some State and Regional Biosolids Coordinators noted that their States had not applied because the application process was costly; EPA was not providing funds to States to implement the Federal program; and they thought they had sufficient authority under their own statutes to carry out the program. As one official from New Jersey stated, "the resources required to put together a delegation package, and the resources required to report information to USEPA once delegation is obtained, may exceed any perceived benefit in receiving delegation." Also, an official from Oregon estimated that, since 1989, his State has spent more than $100,000 on delegation issues, which shifted resources away from biosolids program management for long periods of time.

On October 3, 2001, the OIG received a written statement, from one of the nation's large land application companies, on many of the biosolids issues under review. About delegation the land applier stated:

> *We support the proposition that more states should seek delegated authority. In this vein, we suggest that EPA should promote, at the very least, more partial delegations because many states meet or exceed parts of the [Sludge Rule].*

EPA's Office of Water does not see delegating the program to the States as a high priority. The Assistant Administrator for Water, in responding to the draft of our March 2000 audit report, stated that the Office of Water:

> *. . . does not expect to devote significant effort to encouraging the Regions to delegate the biosolids program to the States. At the present time, there is little incentive for the States to seek delegation, and some States see impediments to delegation, e.g., the effect of State self-audit statutes, and issues related to the Endangered Species Act and the National Environmental Policy Act.*

The Federal biosolids program is being implemented in five States. Although State biosolids programs may be implemented in the remaining States, they may not mirror the Federal program. Given EPA's lack of resources devoted to the Federal program and the small number of delegated States, EPA cannot be certain that all citizens in non-delegated States are provided at least the same level of protection as in the Federal program.

Extent to Which Biosolids Are Land Applied in Seven States

There can be a wide variation in how biosolids are managed in different States. We were able to obtain, from seven States, information on the quantities of biosolids generated, land applied, and exported. These seven are not meant to be a representative sample of all States, but the information they provided illustrates some of the differences in management. For example, New York land applied only 10 percent of the biosolids it generated and exported almost half. In contrast, Colorado land applied over 80 percent of the biosolids it generated and exported none. In Virginia, 45 percent of the biosolids land applied were imported from other States. In New Jersey, only 3 percent of biosolids land applied were imported, and two other States did not land apply any imported biosolids. The data are presented in Table 4 and in greater detail in Appendix B, which also contains maps of the seven States showing counties where biosolids are land applied.

Table 4:
Class B Biosolids Land Application Data for Seven States

State	Biosolids Generated (DMT/yr) [4]	Land Application of In-State Generated Biosolids (DMT/yr)	Land Application of Imported Biosolids (DMT/yr)	Exported Biosolids (DMT/yr)
Colorado	59,842	49,358	14,371	0
Florida	244,890	161,627	0	0
Maryland	131,998	79,971	14,946	37,635
New Jersey	320,000	183,178	5,794	85,409
New York	327,300	33,900	14,812	157,300
Virginia	225,000	95,868	78,437	< 1,000
Wisconsin	159,750	84,725	0	0

[4] Not all generated biosolids are land applied. Some are incinerated or placed in a landfill. Therefore, the Land Application of In-State Generated Biosolids column numbers added to the Exported Biosolids column numbers do not equal the Biosolids Generated column numbers.

Responding to and Tracking Health Complaints

The National Whistleblower Center sent us a list of 21 complaints alleging well contamination, illness, or death in which exposure to sludge was identified as a possible cause. The Center contended that EPA failed to investigate any of these cases. In this section, we will examine EPA's response to the 21 alleged complaints and the extent to which EPA had a standardized process to investigate and retain data on complaints regarding exposure to sludge.

Responding to Alleged Complaints

We obtained information on investigations of the 21 cases through electronic correspondence and interviews with EPA Regional and State Biosolids Coordinators; EPA Headquarters staff in the Office of Water; and, in a few cases, local officials and members of the public. We are defining investigation to mean a response by EPA or a State agency to a reported complaint. Because our focus was on whether EPA responded to the complaint, we did not attempt to conduct site visits or interview complainants.

Of the 21 cases, 14 were investigated by EPA and/or a State agency. According to EPA and State officials, five of the remaining seven alleged health complaints were not reported to them. The two remaining cases were not biosolids related because they involved non-sludge composting facilities. A breakdown is in Table 5.

Table 5:
Information on 21 Cases

Response	Number of Incidents
Investigated by EPA	2
Investigated by EPA and a State Agency	5
Investigated by EPA and a County Agency	1
Investigated by a State Agency	6
Not Investigated (EPA or State Biosolids Program Officials stated these cases were not reported to them.)	5
Allegation involved non-sludge composting facilities	2
Total	21

Although EPA has sometimes addressed health effects in response to biosolids complaints, EPA responses tend to involve compliance issues. EPA officials said investigating health impacts from biosolids is not an EPA responsibility; rather, they believe it is the responsibility of the National Institute of Occupational Safety and Health, the Centers for Disease Control, and local health departments. Furthermore, EPA does not have a formal process to track health-related complaints as we discuss below. In general, we did not obtain information on the types of investigations conducted by State agencies. However, at least some of the State investigations, and the one done by the county, involved health issues.

Tracking Process

In addition to looking at the National Whistleblower Center's 21 cases, we also discussed EPA's process for tracking health-related complaints about biosolids. EPA officials told us that there is no central EPA system for these complaints. If a request comes into Headquarters for information about a particular complaint, Office of Water staff contact Regional Biosolids Coordinators to gather details about a specific incident. The Pathogen Equivalency Committee also receives complaints about health issues related to land application. These are reviewed by the physician member of the Committee.

In contrast to EPA, Maryland has implemented a more centralized, automated approach. According to a State official, Maryland has a single database to handle complaints for all program areas, not only biosolids, and has also developed an electronic form for recording and investigating biosolids odor complaints. Maryland has devoted more staff to running its biosolids program (12) than all but one other State. Maryland's 12 FTEs in 2000 were more than that of all 10 EPA Regional offices combined.

Further, the letter from the land application company noted:

> *...better tracking of odor and any health complaints is essential for improving land application of biosolids and its public acceptance.... [O]ne resolution is to initiate a regulatory requirement for a comprehensive cradle-to-grave tracking system. This could be accomplished without high cost by using modern computerized tracking tools. It could also be managed at the state and local level, where it could be integrated with local and state public health agencies, as appropriate.*

While a tracking system similar to the one suggested by the land applier could be a tremendous help to Regional and State enforcement personnel, Regions and some States may not have sufficient enforcement personnel to make use of such a system.

Risk Assessment and Pathogen Testing Concerns

Uncertainties in the risk assessment for the Sludge Rule and questions about pathogens in biosolids have contributed to the controversy regarding the safety of the land application of biosolids.[5] Whether research is needed to address risk assessment uncertainties and pathogen issues has been a topic of discussion since the Rule's promulgation. The National Whistleblower Center, in its letter to the OIG, expressed concerns about the adequacy of the risk assessment supporting the Rule, and risks from pathogens in Class B biosolids.

The Preamble to the Sludge Rule states that the Rule's standards are adequately protective and describes approaches taken by EPA to address risk assessment uncertainties. These approaches included conservative assumptions and a commitment to further research. In addition, EPA chose operational standards to manage the risks from pathogens (disease-causing organisms) and vectors (disease-carrying insects or animals) in sludge, because, due to insufficient data, a risk assessment was not conducted on pathogens. Under these standards, biosolids must meet technology-based requirements for minimizing or eliminating pathogens and reducing vector attraction. For pathogens, these requirements can be met by reducing the pathogens in biosolids to below detectable levels (Class A) or to levels that are reduced but still detectable and are coupled with certain restrictions (Class B).

In addition to the Preamble to the Sludge Rule, information for this section's presentation of risk assessment and pathogen issues was obtained from a 1996 study by the National Research Council (*Use of Reclaimed Water and Sludge in Food Crop Production*), and discussions and papers presented at the June 2001 Cincinnati workshop on emerging infectious disease agents in animal manures and biosolids. We also obtained EPA guidance and memos on sewage sludge and the Sludge Rule, and interviewed officials in EPA's Office of Water and Office of Research and Development.

Risk Assessment Supporting the Sludge Rule

As described in the Sludge Rule Preamble, EPA conducted an extensive risk assessment on the potential for adverse effects on public health and the environment from pollutants in sludge. However, the Preamble also describes uncertainties in some important aspects of the risk assessment related to human

[5] Scientific uncertainty is an expected factor in environmental risk assessments. These uncertainties may include the usual variance that exists in scientific measurements and data gaps.

health, human exposure pathways, plant toxicity and uptake, effects on wildlife, and ground water impacts. Due to these uncertainties, EPA made many conservative assumptions as well as some less conservative assumptions for the Sludge Rule. For example, there was a conservative assumption that humans may be more sensitive to a pollutant than animals tested when, in fact, this may not be the case. Another conservative assumption was that a human may be exposed to a pollutant in biosolids for a lifetime whereas the period of exposure may, in fact, be much shorter. Other conservative assumptions related to plant uptake of metals, application rates, soil ingestion, concentrations of pollutants in sludge, ground water contamination, and inhaling organic pollutants.

In general, EPA may adopt a less conservative assumption when the conservative assumption is judged to be unrealistic. For illustration purposes, we selected two of the less conservative assumptions adopted by EPA, to discuss in this section. These assumptions involved the long-term behavior of pollutants (metals) in sludge and plant uptake of metals. The assumption about long-term behavior of metals in sludge was based on the theory that metals bind to sludge, which makes them less available for uptake by plants. The Preamble states that there was limited documentation to support conclusions about the long-term behavior of metals in sludge, e.g., that metals will continue to bind to the sludge over a long period of time.

Regarding plant uptake of metals, the Preamble states that there is uncertainty in the estimates of plant uptake of metals. The calculation method used in plant studies for the Sludge Rule, to estimate how much metal was taken up by plants from sludge, may have resulted in less conservative (lower) estimates of plant uptake of metals than another method would have produced.[6] However, according to the Preamble, there was a compensating factor: the studies used sludge with higher metals concentrations than sludge typically land-applied today. The Preamble suggests that the use of sludge with higher metals content in these studies may have compensated for the less conservative estimates of plant uptake.

Information obtained since the Rule's promulgation supports the Preamble's claim that metals concentrations in biosolids are currently lower than in the past. According to an EPA official, a preliminary analysis of biosolids monitoring data suggests that about 85 percent of land-applied biosolids in the United States now meets the same low metal standards[7] required for EQ biosolids. As explained earlier in this report, EQ biosolids meet the Rule's most stringent standards for pathogens and metals. These preliminary indications of low metals in biosolids are encouraging, but also mean that research results for the Sludge Rule with

[6] The less conservative geometric mean was calculated for these plant uptake studies rather than the more conservative arithmetic mean.

[7] Pollutant (metals) concentrations in Table 3 of section 503.13 of the Sludge Rule.

respect to metals are out of date. A study to verify that 85 percent of land-applied biosolids meets low metals standards might help to alleviate some of the concerns about the long-term behavior of metals in biosolids.

Uncertainties in the risk assessment were discussed by EPA offices during their reviews of the final Rule prior to publication, and scientific debate within EPA on these issues delayed progress on the final Rule. Because there were issues EPA could not resolve before a court-ordered deadline for the Rule's publication, a commitment was made to perform further research (a comprehensive evaluation and monitoring study).

EPA acknowledged this commitment in the Preamble and also acknowledged that, depending on research results, revisions to the risk assessment decisions for the Rule may be necessary. However, due to competing priorities and EPA's determination that biosolids were low risk, only one major study, known as the Oak Ridge Study, was initiated as a result of the commitment. The final draft of the Oak Ridge Study report[8] was not peer reviewed and is not officially endorsed by EPA although it was released to the public at the request of a U.S. Senator. An EPA official said that more work was needed on the study, but the additional work was not funded. As a consequence, the questions on ecological risks from sewage sludge that prompted the study were not satisfactorily answered.

Other studies have been conducted on sewage sludge issues since promulgation of the Rule, but these studies were conducted for purposes other than to address the comprehensive study commitment in the Preamble. Further, there has been no formal process to compare results from these other studies to the Sludge Rule's risk assessment uncertainties. There are no plans to complete the comprehensive study, and uncertainties remain unaddressed by further research.

Concerns About Pathogen Testing

In spite of the lack of a risk assessment on pathogens for the Sludge Rule, the only research on pathogens committed to in the Preamble concerned the ecological effects from pathogens. However, there are indications that more research is needed on risks to human health from pathogens in sludge. When the Sludge Rule was promulgated in 1993, due to safety and liability questions, the food processing industry was reluctant to accept the practice of using treated wastewater and sludge in producing food for human consumption. Therefore, EPA asked the National Research Council of the National Academy of Sciences to conduct a study that resulted in the 1996 report, *Use of Reclaimed Water and*

[8] *Evaluation of the Ecological Risks Associated with Land Application of Municipal Sewage Sludge,* September 30, 1998. Funded by EPA under an Interagency Agreement to Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Sludge in Food Crop Production. Although the Council concluded that the "use of wastewater and sludge in the production of crops for human consumption presents a manageable risk," concerns about pathogens in sludge were discussed in their report. Some of the same concerns were discussed by research scientists during the 2001 Cincinnati Conference. This conference, jointly sponsored by EPA and the U.S. Department of Agriculture, was attended by an international group of research scientists.

Although the Council found in its 1996 study that Class A sludge standards appear to be adequate for public health protection, it stated that "the method used to determine if the [pathogen] standard has been met can be questionable." The Council's report identified a problem regarding the test for the detection of salmonella (a pathogen). The report recommended the salmonella test not be used in evaluating sludge as Class A unless it is used along with the fecal coliform test. Currently the Rule allows either a fecal coliform or salmonella test to be used to show that Class A microbiological requirements are met. Scientists at the 2001 Cincinnati workshop on pathogens were also concerned about the salmonella test.

In addition, the Council report recommended that EPA reevaluate the 30-day waiting period for grazing animals after Class B sludge is applied to fields. This recommendation was due to a finding in Denmark that tapeworms may survive in sludge-treated fields for up to one year. This was another area of concern for scientists at the Cincinnati workshop.

The Council report also recommended that, "EPA should continue to develop and evaluate effective ways to monitor for specific pathogens in sludge." The Council explained that the presence of coliform bacteria, an indicator organism, may not accurately predict the presence of other organisms that may be pathogens. Again, this area of concern was discussed during the Cincinnati workshop.

EPA has asked the National Research Council to conduct a second study on EPA's Sludge Rule. The second study is to review EPA's risk assessment methods, data, and standards for eliminating pathogens in sludge. The Council will also determine whether the recommendations in its 1996 report were adequately addressed. The study is expected to be completed in June 2002. If that study does not also address the research commitment in the Preamble, questions will remain about uncertainties in the risk assessment for the Rule:

- How much of the research conducted since 1993 has sufficiently addressed the original commitment to research in the Sludge Rule Preamble?

- Should additional research be conducted to satisfy the commitment?

- Should there be revisions to the Rule based on subsequent research results?

EPA's Relationship with a Professional Association

The National Whistleblower Center letter stated that EPA's support of the Water Environment Federation "creates an appearance of impropriety." For several years, EPA has made large dollar awards of assistance to two non-profit organizations, the Water Environment Federation (WEF), a professional association, and the Water Environment Research Foundation (WERF). The latter is a research organization that WEF established. During the 3 years ending September 30, 2001, EPA awarded $3.2 million to WEF and $9.7 million to WERF, for a total of $12.9 million. However, 96 percent of the financial support that EPA gave to WEF and WERF was Congressionally mandated ($2.8 million of the $3.2 million awarded to WEF, and $9.6 million of the $9.7 million awarded to WERF). Therefore, EPA had no discretion in awarding these funds.

We reviewed automated information pertaining to assistance agreements awarded to WEF and WERF in EPA's Envirofacts Warehouse and Financial Data Warehouse for the 3-year period. We also reviewed the pertinent assistance agreements, amendments, and decision memoranda. We obtained information from the project officers for the Congressionally-mandated awards. Information on WERF's quality management procedures for research projects funded by EPA was obtained from interviews and a questionnaire sent to EPA employees serving on WERF research project subcommittees. We did not perform a financial audit of any of these awards, nor did we look at allowability of costs for any expenditures associated with these awards.

EPA Funds Awarded to WEF

WEF's stated vision is "preservation and enhancement of the global water environment." WEF's membership includes many professionals in the water and wastewater industries, as well as EPA employees.

Most of the funds EPA awarded to WEF in recent years have been Congressionally mandated for implementation of the National Biosolids Partnership. The Partnership was formed in 1997 "to promote environmentally sound and accepted biosolids management practices." In addition to WEF and EPA, the Association of Metropolitan Sewerage Agencies, a national trade association, is also a partner. WEF is the managing partner for the Partnership. During fiscal years 1999 through 2001, $2,752,800 of the $3,247,800 that EPA awarded to WEF was Congressionally mandated. Further, of the remaining $495,000 in discretionary funds that EPA awarded to WEF, assistance award documents show that $190,000 was awarded competitively.

The Congressionally-mandated funds to WEF are being used for an Environmental Management System (EMS) project. According to the National Biosolids Partnership's web site, EMS is being developed to "help organizations that manage biosolids activities assure compliance with applicable Federal, State, and local regulatory requirements and address other environmental issues such as odors that could cause community concerns." Facilities participating in the EMS program must communicate actively with the public and publicize results of EMS audits. According to EPA officials, 27 facilities participated in the initial EMS pilot demonstration, 13 are in the process of being added, and the Partnership hopes to add 60 more facilities by the end of 2003.

EPA Funds Awarded to WERF

WERF's stated mission is to provide a "balanced water quality research program addressing current wastewater research needs and forecasting future directions." For fiscal years 1999 through 2001, $9.6 million of the $9.7 million that EPA awarded to WERF was Congressionally mandated. With funds provided by EPA, WERF subcontracts to other organizations to perform the research. Some of the recent biosolids-related research projects included: *Assessing Bioavailability of Metals in Biosolid-Amended Soils: Root Exudates and their Effects on Solubility of Metals, Nitrogen Management Protocols for Biosolids Beneficial Use,* and *Pathogen Destruction Efficiency in High Temperature Digestion.*

According to the 1999 Annual Report that WERF provided to EPA, 58 EPA employees were participating on 100 project subcommittees at the end of 1999; however, not all of these projects were funded by EPA. For each research project, a project subcommittee is formed of five to six outside experts – including representatives from universities, municipalities, industry, and sometimes EPA. At least one member from EPA must be on the committee when EPA funds are used for the project. We surveyed or interviewed 19 EPA employees, serving on a total of 25 project subcommittees. The results of the interviews and survey did not indicate a lack of quality management procedures in WERF research projects; however, our survey instrument did not allow us to reach definitive conclusions about quality management procedures in WERF projects.

Public Acceptance Concerns

Despite Federal regulatory safeguards, public acceptance of land application of biosolids has been mixed, and public scrutiny of the practice continues. There are public concerns regarding the impact of biosolid land application on health, quality of life, and protection of natural resources. These concerns have led a number of counties and municipalities to ban or restrict the land application of biosolids. Public perception regarding biosolids land application can have a significant impact on the implementation of the program.

Public Concerns About Land Application

Public perceptions can be critical in influencing the choice of options used to manage biosolids. As EPA noted in a September 1999 report:

> *The public's perceptions of biosolids treatment and application can affect whether a facility is built, where it is sited, and how it is operated. Although public perception is often not based on science and can be irrespective of the degree of risk to human health or the environment, it can present a significant deterrent to increased beneficial use. Understanding what the public concerns are can allow biosolids managers to address these concerns as part of their biosolids management program.*[9]

Due to public concerns about possible consequences, such as odors, health effects, and environmental impacts from biosolids, there has been opposition to land application in some locations. Several municipalities and counties in the United States have enacted bans and restrictive ordinances against the land application of biosolids. In California, nine counties issued bans or restrictive ordinances. In Florida, two counties placed restrictions on the use of Class B biosolids. In addition, 67 municipalities in Maine, Massachusetts, New Hampshire, and Pennsylvania have instituted bans or restrictive ordinances on biosolids land application. Several counties in Virginia also passed restrictive ordinances, although the State Supreme Court later ruled against such restrictions.

Health Concerns

Public resistance stems in part from concerns about potential health impacts. Although the Sludge Rule includes a treatment requirement to reduce pathogens to low levels, pathogens may still be present in Class B biosolids. Even with site

[9] *Biosolids Generation, Use, and Disposal in The United States.* EPA-530-R-99-009, September 1999.

restrictions designed to minimize the potential for human contact, concerns have been raised in some magazine and newspaper articles and by some members of the public about the possible health effects from contact with biosolids, including inhaling biosolids dust. The National Whistleblower Center alleged that complainants have experienced adverse health effects such as nausea, burning eyes, dizzy spells, respiratory symptoms, and even death resulting from biosolids.

EPA's position, explained in a 1995 guide to the Sludge Rule risk assessment, is that pathogen levels for Class B biosolids, when coupled with crop harvesting and site access restrictions, have been demonstrated to be sufficient to protect public health and the environment.[10] While we did not attempt to evaluate this position, we noted in our prior audit report of March 2000 that EPA does not have an effective program for ensuring compliance with land application requirements, e.g., crop harvesting and site access restrictions.

Class A vs. Class B Biosolids

Questions about compliance with Class B requirements suggest that Class A biosolids would be preferable in terms of safety and public confidence. To increase the public's acceptance of biosolids land application, some sewage treatment plants are changing their processes to be able to produce Class A instead of Class B biosolids. For example, as part of a $300 million upgrade, the sewage treatment plant in Alexandria, Virginia, is spending approximately $45 million to install equipment to produce Class A rather than Class B biosolids. However, plant officials explained that their decision to upgrade treatment would not necessarily be the right one for every plant. Because the Alexandria plant is in a heavily populated community where there are no land application sites, it has to compete for land application sites in other locations. Other plants may be located where land application sites are more available. Further, Alexandria officials told us that the expense of converting to produce Class A biosolids may mean that some small municipalities will not be able to afford to convert to Class A.

There is another concern related to Class A biosolids. Sewage treatment plants are allowed six alternatives for meeting Class A pathogen requirements (i.e., reduction of pathogens to below detectable levels). Of the six alternatives, two of those (Alternatives 3 and 4) have been criticized by some EPA and State officials, as well as by a land applier, for not being sufficiently protective. When Class A Alternatives 1, 2, or 5 are used for meeting pathogen requirements, treatment methods are described and required by the Rule. When Alternative 6 is used, the treatment method must be approved by the permitting authority. However, for Alternatives 3 and 4 a treatment method is not specified. A facility can designate its biosolids as Class A based on the absence of fecal coliform or salmonella and

[10] *A Guide to the Biosolids Risk Assessments for the EPA Part 503 Rule***,** EPA 832-B-93-005, September 1995.

the absence of enteric viruses and viable helminth ova. These two alternatives have been criticized because the absence of enteric viruses and helminth ova may not indicate the absence of other disease-causing organisms in the biosolids.

Once biosolids leave the control of the preparer, there are no regulations over land application of EQ biosolids, and there are reduced requirements for land application of Class A biosolids not designated EQ. Therefore, good controls are necessary to ensure that production of such biosolids meets pathogen requirements. It has been recommended by some Federal and State officials and by at least one member of the land application industry that the Sludge Rule be changed to either eliminate or modify Alternatives 3 and 4.

As stated in the 1996 National Research Council report, "General acceptance of sludge application for food crop production probably hinges most on the development of successfully implemented projects that meet State and Federal regulations and address local public concerns." This means that adequate oversight and enforcement of Class A and Class B standards are necessary for public confidence in land application.

Quality of Life Concerns

Quality of life concerns arise as a result of odors around land application sites. When two Florida counties stopped allowing land application of Class B biosolids, the counties cited odors as one of the reasons. EPA noted in a July 2000 biosolids guide that, "Malodors are the single most important cause of public dissatisfaction with biosolids...." Further, EPA stated in the September 1999 report (see footnote 12), that:

> *Not only do the odors themselves cause a public concern, but odors also trigger fears that "foul-smelling" residues from municipalities and industry must be toxic and harmful. In some parts of the country, where rapid suburbanization of former farmland has occurred, biosolids application might no longer be used on the remaining farmland because proximity to residential areas makes actual or potential odor concerns unacceptable to the new neighbors.*

In the same document, EPA further stated that, "treatment and good management practices can control most odor problems keeping them to a minimum." EPA and the U.S. Department of Agriculture are jointly conducting odor-related research. The project is titled, *Interagency Research on the Physiological Effects of Volatile Emissions from Land Applied Biosolids and Animal Manures*.

Truck traffic around land application sites is also a quality of life concern. According to the EPA Region 9 Biosolids Coordinator, heavy truck traffic caused

concerns in two California counties and was a factor in both counties' decisions to limit land application. Biosolids are typically delivered to application sites in tractor trailers or tanker trucks. Application rates generally equate to about one tractor trailer truckload per acre. Therefore, a 50-acre field could receive about 50 truckloads of biosolids. In Virginia alone, biosolids were land applied on more than 39,000 acres in the year 2000. This suggests that as many as 39,000 truckloads of biosolids were on the road in Virginia that year.

Concerns About Protection of Natural Resources

Others have expressed concerns about the impact of biosolids on natural resources. Members of some communities worried that the run-off from biosolids could contaminate ground water and surface water. Four counties in California and two in Florida have restricted land application of biosolids due, in part, to concerns about contamination of the water supply. Biosolids contain significant amounts of nitrogen and phosphorus. Run-off of these nutrients into surface water may impair its use for fisheries, recreation, industry, and as a drinking water source. Nitrate leaching from biosolids into groundwater can impact local wells or eventually discharge to surface waters.

Public Perceptions and the Future of Land Application

Public perceptions may not always be accurate, but they should not be ignored. At the 2001 National Biosolids Conference, State Biosolids Coordinators discussed the importance of public perception and public acceptance and made the following points:

- *The news has little information about biosolids, and the public needs facts.*
- *Pathogens, which have been linked to recent publicized deaths, are a concern.*
- *Odors are also an issue, plus odors trigger concerns about pathogens.*
- *Lack of public acceptance makes the program vulnerable to collapse.*
- *We are losing the public acceptance battle.*
- *How can we alleviate public concerns?*

The importance of public perception is acknowledged by EPA in the September 1999 report.

> *Overcoming public resistance to the beneficial use of biosolids involves a combination of sensitivity to public perception issues, a framework within which the concerns can be addressed, and a willingness to address these issues through management practices and technologies, effective outreach programs, and active marketing of biosolids products.*

At the same time that EPA's resources for the biosolids program are decreasing, some members of the public and the media continue to question the safety of biosolids land application. However, EPA's determination that the program is low-risk and low-priority translates into few EPA funds available to address public concerns. In addition, the Agency does not have a centralized system to keep track of the complaints of adverse health effects that are reported. Not addressing public concerns about safety, gaps in the science, fear of long-term impacts, or any other real or perceived concern may result in severely limiting or halting the practice of biosolids land application.

Scope and Methodology Details

In February 2001, staff from the EPA OIG met with officials from the National Whistleblower Center and an EPA research scientist. The purpose of the meeting was to discuss a series of allegations made by the Center relating to EPA's development and implementation of the Sludge Rule. At the request of the OIG, the Center prepared and, in March 2001, submitted a written summary of the concerns that were raised by them and the EPA research scientist. The March correspondence requested that we conduct an inquiry about the Center's concerns. We began our field work in May 2001 and completed field work in September 2001.

During May and June OIG staff gathered information about three areas of concern in the Center's summary: science supporting the safety of biosolids land application, relative to the risk assessment conducted for the Sludge Rule and pathogen testing; EPA's process for tracking and investigating complaints of adverse health effects due to biosolids land application; and EPA's relationship with the Water Environment Federation.

During our fieldwork on these three areas we learned of concerns from other stakeholders. In addition, the inadequacies we found in our March 2000 audit to date had not been resolved. Therefore, we expanded our scope to include these issues: EPA and State biosolids program staff, delegation of the biosolids program to the States, the extent to which biosolids are land applied in seven States, and public acceptance concerns. We discuss the seven issues in this status report, without developing findings and recommendations. This review was considered a special project and, as such, was not conducted in accordance with all of the generally accepted government auditing standards.

Our fieldwork included interviews with EPA officials and research scientists in the Offices of Water, Research and Development, and Administration and Resources Management. We also reviewed EPA regulations, policy, guidance and memoranda on biosolids and the risk assessment conducted for the Sludge Rule. In order to ensure the accuracy of the facts we present in our report, we solicited comments on our draft report from program officials and scientists in EPA who had provided us with information.

To obtain an understanding of State program issues, we attended the third annual *National Biosolids Conference/Workshop*, held June 25-28, 2001, in Potomac, Maryland. The 2001 conference was jointly sponsored by EPA and the Wisconsin Department of Natural Resources. Attendees were primarily State and Regional Biosolids Coordinators, and technical and scientific staff from EPA's Office of Water and Office of Research and Development. At the conference, we heard presentations by State and Federal officials, participated in general discussion sessions, and had the opportunity to meet individually with State Biosolids Program Coordinators. Seven

of the State Biosolids Coordinators later provided us with the land application data, which we have presented in Appendix B.

Information on EPA's response to 21 alleged health complaints and the extent of EPA's tracking system for biosolids-related complaints was obtained through electronic correspondence and/or interviews with EPA Regional and State Biosolids Program Coordinators; EPA Headquarters staff in the Office of Water; and, in a few cases, local officials and members of the public. Because our focus was on EPA's involvement, we did not attempt to make site visits or interview complainants.

Information on EPA's risk assessment for the Sludge Rule and pathogen issues was obtained from the Preamble to the 1993 Sludge Rule; a 1996 study by the National Research Council, *Use of Reclaimed Water and Sludge in Food Crop Production*; and discussions and papers presented at the *Workshop on Emerging Infectious Disease Agents and Issues Associated with Animal Manures, Biosolids and Other Similar By-Products*, held on June 4-6, 2001, in Cincinnati, Ohio. This workshop was jointly sponsored by EPA and the U.S. Department of Agriculture. In addition, we obtained information from EPA guidance and memos on sewage sludge and the Sludge Rule, and interviewed officials in EPA's Office of Water and Office of Research and Development. We also attended the March 2001 initial meeting of the National Research Council's Committee on Risks from Toxicants and Pathogens in Biosolid Fertilizers. This Committee is conducting the Council's second study on EPA's Sludge Rule.

For our review of EPA's relationship with WEF, we reviewed information pertaining to EPA grants to WEF and WERF in EPA's Envirofacts Warehouse and Financial Data Warehouse for the 3 years ending September 30, 2001. We also reviewed relevant assistance agreements, amendments, and decision memoranda. We obtained information on the Congressionally-mandated awards from the project officers. Information on WERF's quality management procedures for research projects funded by EPA was obtained from interviews and a questionnaire sent to EPA employees serving on WERF research project subcommittees. We did not perform a financial audit of any of these awards, nor did we look at allowability of costs for any expenditures associated with these awards.

For a broader perspective on viewpoints and concerns outside of EPA and the States, we conducted interviews with or reviewed information from private citizens, members of the academic community, environmental groups, a farm bureau association, the U.S. Department of Agriculture, and the National Institute for Occupational Safety and Health. To understand industry concerns, we reviewed information from an industry trade organization and met with officials from a company in the land application business. We also toured a local wastewater treatment plant and interviewed officials and personnel responsible for plant operations.

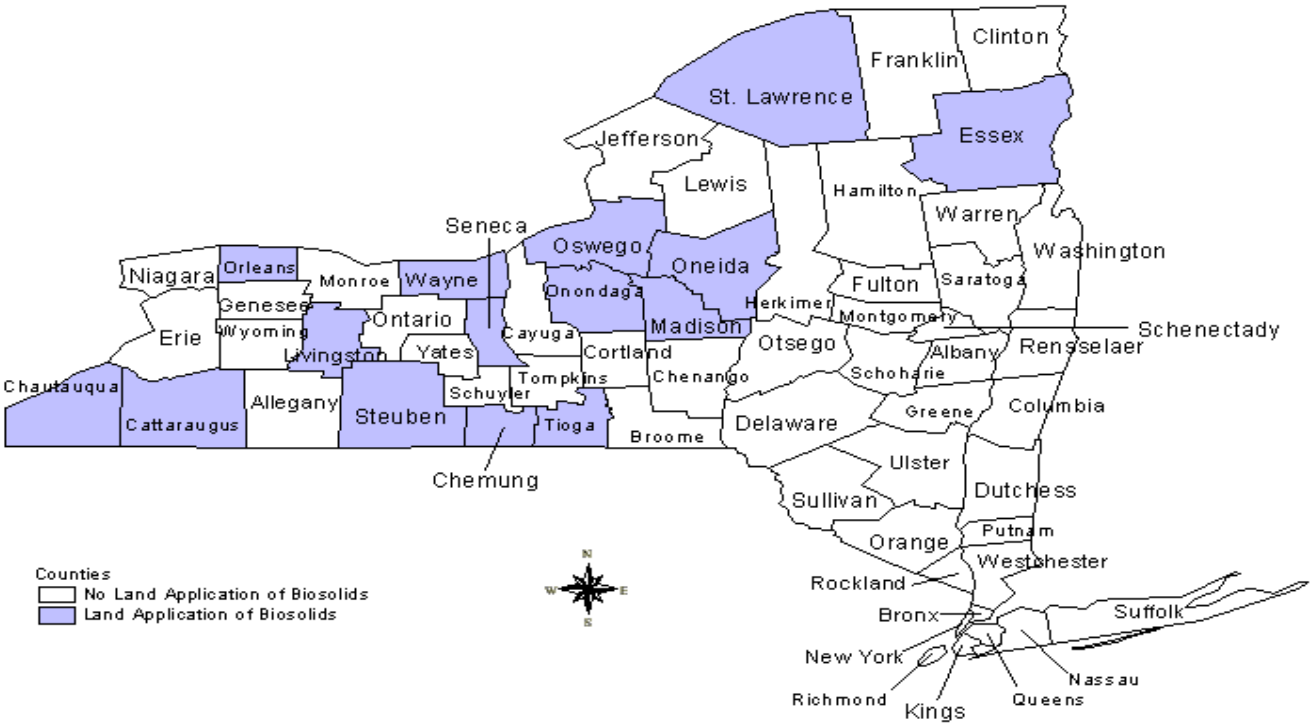
Appendix B

Land Application Data for Seven States

Land application of biosolids varies by State, as well as by county within States. When we sought by-county data, we found that many States do not collect information by county on land application. However, we were able to obtain data on land application by county from seven States: Colorado, Florida, Maryland, New Jersey, New York, Virginia, and Wisconsin. This group of States includes a large importer of biosolids (Virginia); a large exporter of biosolids (New York); and a State to which EPA has delegated the biosolids program (Wisconsin).

The States provided data on counties that accept biosolids land application. These counties are shaded in gray on the State maps found on the following pages. States did not report land application for unshaded counties. The States in this group also provided state-wide data on the amount of sludge generated, amount land applied in-state, and number of sewage treatment plants (STPs). These data are presented in tables below the State maps. Some States provided data on acres used for land application and/or the dry metric tons (DMT) of biosolids that were land applied. Specific county data are presented in a second table below each map. Not all States were able to provide the same type of county data; therefore county data tables vary from State to State. Where possible, we differentiated between Class A, Class B, or exceptional quality (EQ) biosolids.

Land Application of Class B Biosolids in New York (2000)



State	Number of STPs	Biosolids Generated by STPs (DMT/yr)	Land Application of In-State Generated Biosolids (DMT/yr)	Land Application of Imported Biosolids (DMT/yr)	Exported Biosolids (DMT/yr)
New York	584	327,300	33,900*	14,812**	157,300

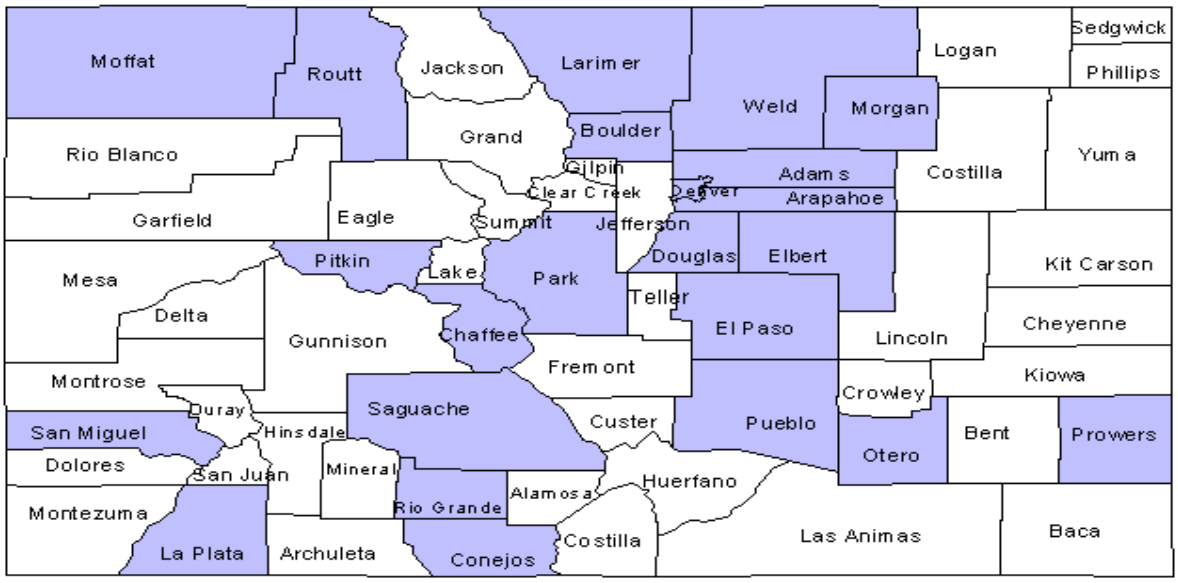
* 3,600 DMT Class B and 30,300 DMT Class A

** PA (86 DMT), MA (146 DMT), and NJ (14,580 DMT); Class A only

County*	Acres*	Quantity (DMT/yr)*
Essex	189	190
Oneida	230	160
St. Lawrence	410	250
Madison	492	1,400
Onondaga	66	20
Oswego	30	30
Tioga	280	200
Chemung	30	30
Livingston	50	30
Orleans	206	240
Seneca	79	70
Steuben	1,836	770
Wayne	43	110
Cattaraugus	60	90
Chautauqua	48	10
Total:	**4,049**	**3,600**

* County information is for Class B biosolids only

Land Application of Biosolids in Colorado (2000)



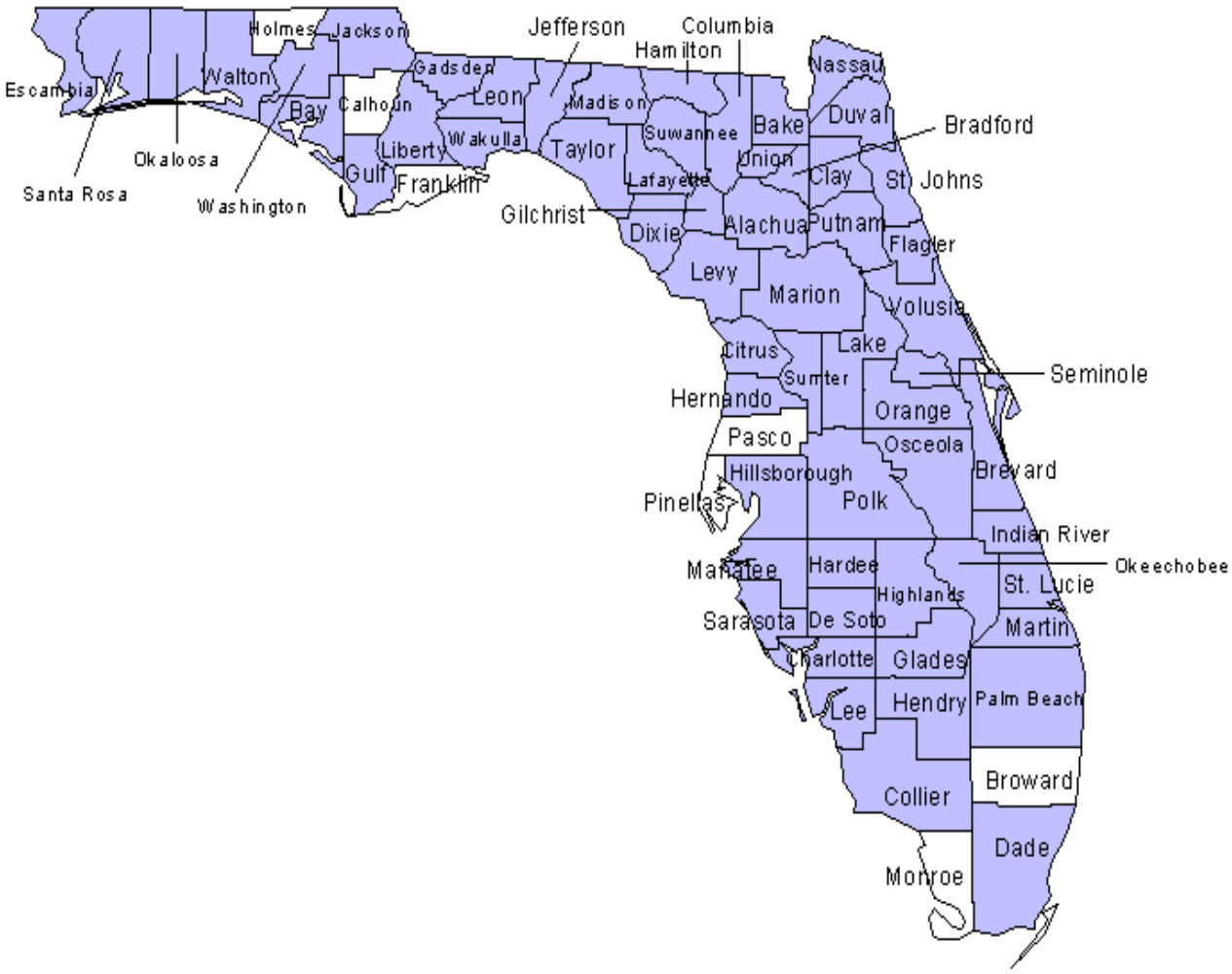
State	Number of STPs	Biosolids Generated by STPs (DMT/yr)	Land Application of In-State Generated Biosolids (DMT/yr)	Land Application of Imported Biosolids (DMT/yr)	Exported Biosolids (DMT/yr)
Colorado	219	59,842	49,358	14,371*	0

* Class B imported from NY and land applied in Prowers Co.

County	Acres*	Quantity (DMT/yr)
Adams	1,253	3,133
Arapahoe	10,192	25,481
Boulder	230	576
Chaffee	99	248
Conejos	82	204
Denver	44	109
Douglas	221	552
El Paso	41	102
Elbert	2,896	7,240
Larimer	482	1,205
La Plata	270	675
Moffat	70	174
Morgan	90	226
Otero	14	35
Park	6	16
Pitkin	30	74
Prowers	5,748	14,371
Pueblo	525	1,312
San Miguel	34	84
Rio Grande	774	1,936
Routt	187	469
Saguache	79	198
Weld	2,124	5,309
Total:	**25,492**	**63,729**

*Acres based on typical application rates

Land Application of Class B Biosolids in Florida (2000)

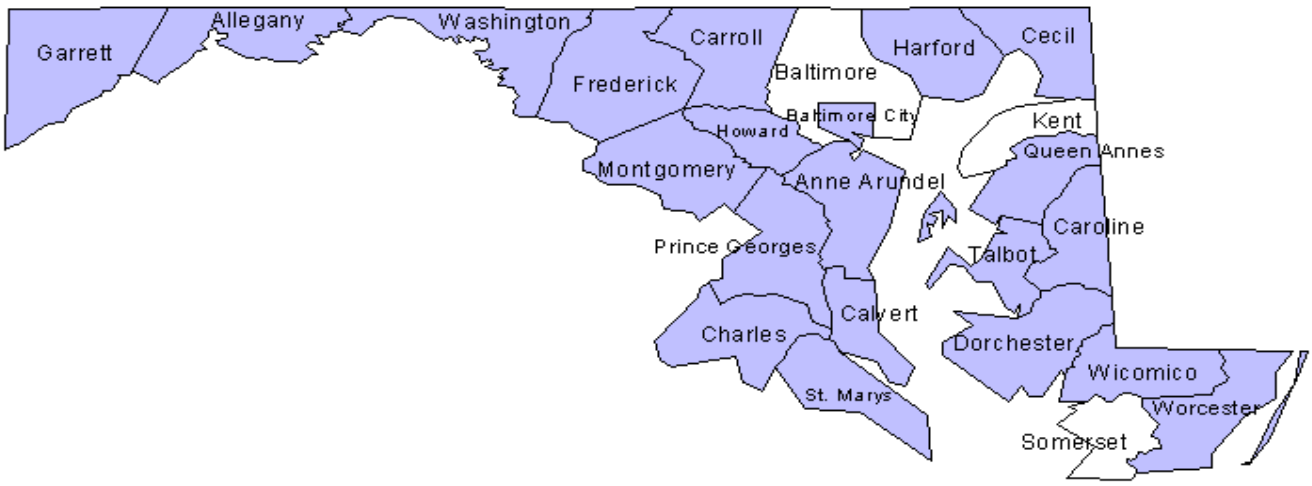


State	Number of STPs	Biosolids Generated by STPs (DMT/yr)	Land Application of In-State Generated Biosolids (DMT/yr)	Land Application of Imported Biosolids (DMT/yr)	Exported Biosolids (DMT/yr)
Florida	2,640	244,890	161,627*	0**	0

* Class B only

** Class AA (EQ) only; WI (13,791 DMT), NY (38,926 DMT), MD (13,646 DMT), MA (8,856 DMT), TX (23 DMT), and GA (3,507 DMT)

Land Application of Biosolids in Maryland (2000)



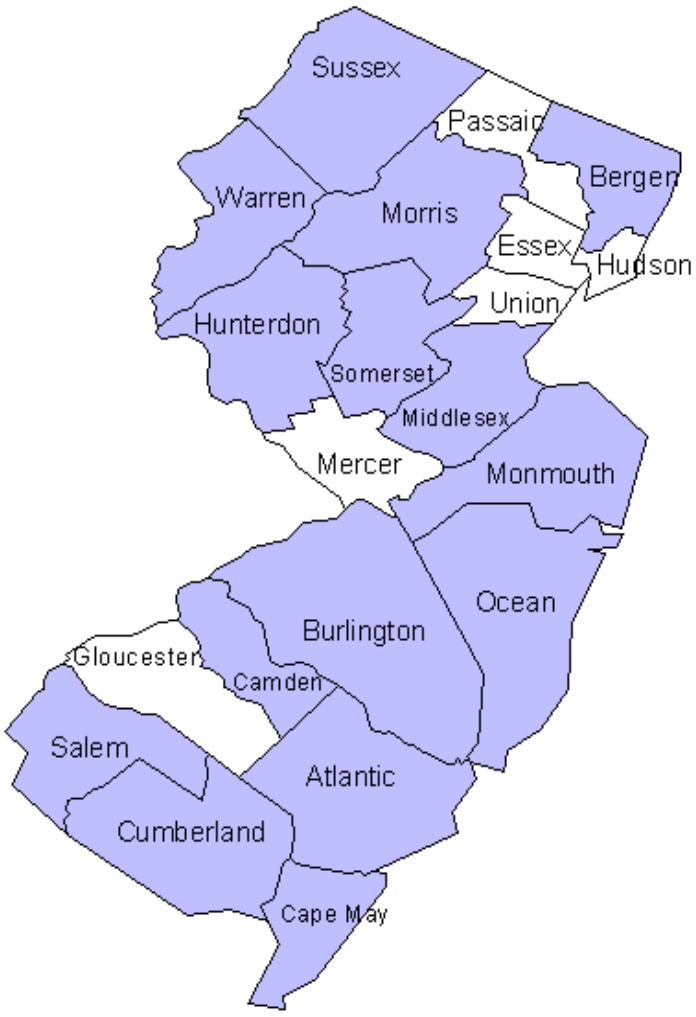
State	Number of STPs	Biosolids Generated by STPs (DMT/yr)	Land Application of In-State Generated Biosolids (DMT/yr)	Land Application of Imported Biosolids (DMT/yr)	Exported Biosolids (DMT/yr)
Maryland	307	131,998	79,971	14,946*	37,635**

* 23,578 DMT were imported and 8,633 DMT were stored for future use; DC (8,831 DMT), NJ (3,920 DMT), VA (5,501 DMT), PA (2,611 DMT), and WI (2,715 DMT)
** VA, WV, PA, DE, UT, and TN

County	Quantity (DMT/yr)
Allegany	820
Anne Arundel	840
Calvert	2,494
Caroline	3,235
Carroll	238
Charles	4,814
Dorchester	588
Fredrick	6,908
Garrett	18,116
Harford	2,732
Howard	1
Montgomery	70
Prince George's	3,833
Queen Anne's	2,657
St. Mary's	7,838
Talbot	682
Wicomico	510
Worcester	384
Baltimore City*	30,019
Cecil*	125
Washington*	1,131
Total:**	**88,035**

* Counties that received Class A only
** An additional 6,882 DMT were distributed as Class A (not tracked to a particular county)

Land Application of Biosolids in New Jersey (2000)



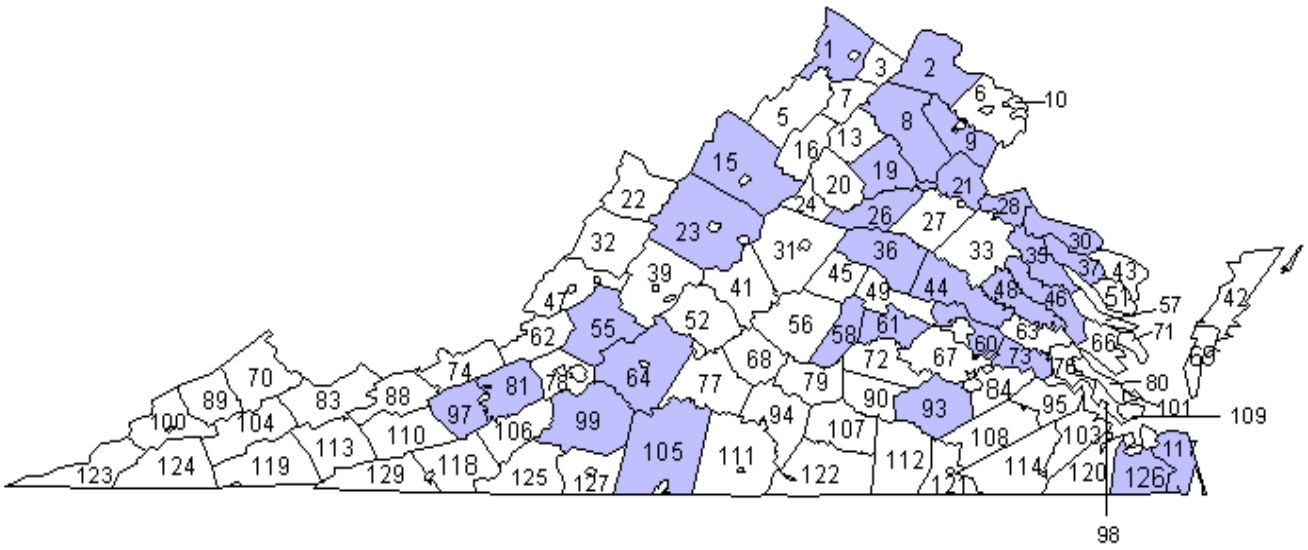
County	Acres for Class B Biosolids	Quantity* (DMT/yr)
Atlantic	0	789
Bergen**	0	8,423
Burlington*	339	9,736
Cumberland*	802	36,490
Hunterdon	0	572
Middlesex**	0	43,564
Monmouth	0	1,218
Morris	0	1,786
Ocean	0	862
Salem*	209	2,533
Somerset	0	95
Sussex	0	783
Warren	0	12,459
Atlantic/Camden*	393	2,041
Cape May/Salem	0	879
Cape May/Other NJ areas	0	1,947
Cumberland/Atlantic	0	133
Other NJ areas	0	64,662
Total:	**1,743**	**188,972**

***** All quantities are Class A except: Burlington (998 DMT), Cumberland (1,371 DMT), Salem (1,654 DMT), and Atlantic/Camden (2,041 DMT)
****** Used as landfill cover

State	Number of STPs	Biosolids Generated by STPs (DMT/yr)	Land Application of In-State Generated Biosolids (DMT/yr)	Land Application of Imported Biosolids (DMT/yr)	Exported Biosolids (DMT/yr)
New Jersey	332	320,000*	183,178**	5,794***	85,409****

* 230,000 DMT were generated, however, the amount increased to 320,000 DMT due to additives (lime)
** 177,114 DMT Class A and 6,064 DMT Class B
*** Class A only; NY (4,752 DMT), WI (226 DMT), PA (816 DMT)
**** Includes 4,060 DMT and another unknown amount processed in NJ from out-of-state sources in NY, PA, and CT; CT (333 DMT), Canada (679 DMT), WV (247 DMT), OH (2,231 DMT), MD (6,951 DMT), PA (5,490 DMT), NY (14,134 DMT), and VA (55,344 DMT)

Land Application of Biosolids in Virginia (2000)



Fredrick - 1, Loudoun - 2, Fauquier - 8, Prince William - 9, Rockingham - 15, Culpeper - 19, Stafford - 21, Augusta - 23, Orange - 26, King George - 28, Westmoreland - 30, Essex - 35, Louisa - 36, Richmond - 37, Hanover - 44, King and Queen - 46, King William - 48, Botetourt - 55, Cumberland - 58, Henrico - 60, Powhatan - 61, Bedford - 64, Charles City - 73, Montgomery - 81, Dinwiddie - 93, Pulaski - 97, Franklin - 99, Pittsylvania - 105, Virginia Beach - 117, Chesapeake - 126

State	Number of STPs	Biosolids Generated by STPs (DMT/yr)	Land Application of In-State Generated Biosolids (DMT/yr)	Land Application of Imported Biosolids (DMT/yr)	Exported Biosolids (DMT/yr)
Virginia	792	225,000	95,868	78,437*	< 1,000**

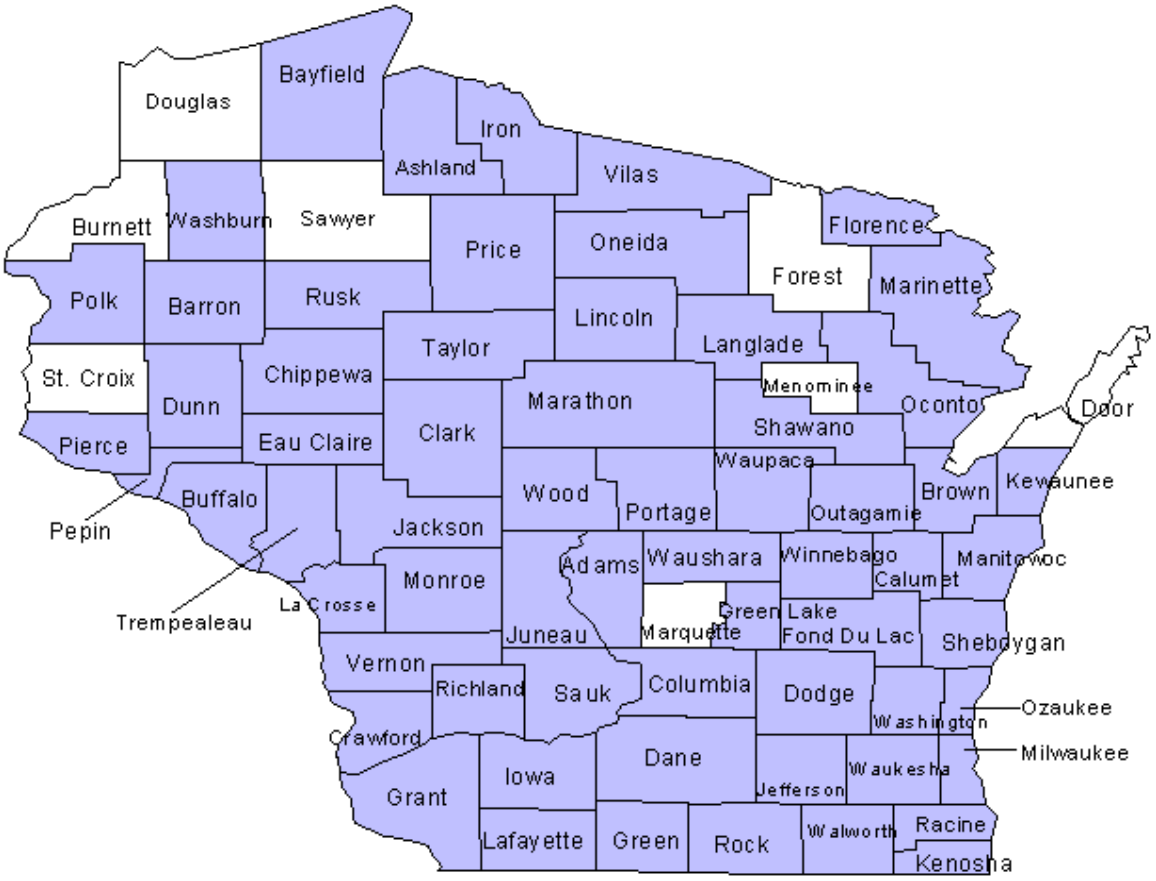
* MD, NJ, NY, and PA
** MD and NC

County	Acres	Quantity (DMT/yr)
Augusta*	215	394
Bedford	503	3,145
Botetourt	197	1,008
Charles City	1,287	5,938
Chesapeake*	288	1,201
Culpeper	5,759	30,495
Cumberland	2,745	10,693
Dinwiddie	1,291	7,342
Essex	1,266	5,416
Fauquier	2,050	11,352
Franklin	987	6,945
Fredrick	1,535	5,981
Hanover	1,430	6,630
Henrico	448	1,920
King & Queen	938	4,122
King George	822	5,639

County	Acres	Quantity (DMT/yr)
King William	3,717	13,403
Loudoun	1,300	4,436
Louisa	3,579	18,316
Montgomery*	164	292
Orange	1,967	9,490
Pittsylvania	1,681	3,045
Powhatan	122	475
Price William	227	1,426
Pulaski*	880	459
Richmond	345	1,465
Rockingham*	492	867
Stafford*	213	442
Virginia Beach*	560	2,060
Westmoreland	2,435	15,623
Total:	**39,443**	**179,561**

* County data not included in the land application State totals

Land Application of Biosolids in Wisconsin (2000)



State	Number of STPs	Biosolids Generated by STPs (DMT/yr)	Land Application of In-State Generated Biosolids (DMT/yr)	Land Application of Imported Biosolids (DMT/yr)	Exported Biosolids (DMT/yr)
Wisconsin	406	159,750*	84,725**	0	0***

* 75,000 DMT Class B and 50,000 DMT EQ

** Includes distributed EQ

*** Milwaukee is the only county that exports biosolids; EQ only (40,275 DMT)

Land Application of Biosolids in Wisconsin (2000)

County	Acres	Quantity (DMT/yr)
Adams	294	492
Ashland	32	171
Barron	364	328
Bayfield	11	14
Brown	230	460
Buffalo	11	8
Calulmet	134	152
Chippewa	376	521
Clark	389	279
Columbia	254	1,162
Crawford	151	202
Dane	4,737	11,655
Dodge	1,101	715
Dunn	395	368
Eau Claire	896	1,265
Florence	150	212
Fund du Lac	81	29
Grant	746	629
Green	369	693
Green Lake	163	89
Iowa	491	167
Iron	30	4
Jackson	63	32
Jefferson	491	126
Juneau	53	59
Kanosha	80	110
Kewaunee	10	6
La Crosse	1,175	1,594
Lafayette	197	43
Langlade	204	147
Lincoln	236	241
Manitowoc	932	1,526
Marathon	1,942	2,700
Marinette	489	995
Milwaukee	2,014	6,162
Monroe	93	256
Oconto	126	721
Oneida	69	106
Outagamie	1,171	7,853
Ozaukee	526	776
Pepin	21	36
Pierce	83	4
Polk	152	142
Portage	641	649
Price	50	47
Racine	1,035	4,328
Richland	291	325
Rock	1,708	1,629
Rusk	85	6
Sauk	171	821
Shawano	136	201
Sheboygan	954	2,430
Taylor	442	192
Trempealeau	177	341
Vernon	162	80
Vilas	37	40
Walworth	747	1,050
Washburn	46	64
Washington	478	990
Waukesha	1,377	3,231
Waupaca	660	847
Waushara	10	11
Winnebago	969	10,395
Wood	1,048	1,376
Total*:	**32,460**	**72,302**

*County data is incomplete (missing 12,423 DMT/yr)

Agency Comments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB -1 2002

OFFICE OF
WATER

MEMORANDUM:

SUBJECT: Draft Status Report on Land Application of Biosolids

FROM: G. Tracy Mehan, III /S/
Assistant Administrator

TO: Judith J. Vanderhoef, Project Manager
Headquarters Audit Division (2443)

Thank you for the opportunity to comment on your draft status report on land application of biosolids. Comments of the Office of Water are attached. Should you wish to discuss this matter further, please contact our Inspector General Liaison, Judy Hecht, at (202) 260-5682.

Attachments

cc Sylvia Lowrance
Henry Longest, II
Nikki Tinsley

- Page 1 - Introduction - 2nd paragraph:
    - At some point in the past, landfill space was limited and expensive. However, that is no longer universally true. Landfill space may be limited in some States, and some States limit or restrict disposal of sludge in landfills. EPA/OSWER still encourages recycling for other reasons, including reduced demand on available landfill space, reduced energy consumption, and reduced production of greenhouse gases.
    - revise the 3rd sentence (4th line) to read "As a result, land application of **treated sewage** sludge ..." [New words are in **bold**.]
- Page 1 - Background - 1st paragraph:
    - It would be better to say ". . .sludge may contain toxic pollutants . . . " instead of ". . . sewage sludge contains toxic pollutants . . . "
    - We suggest you revise the 2nd sentence (3rd line) to read "... have resulted in **the production of** large quantities of sewage sludge." [New words are in **bold**.]
- Page 2 - text immediately below chart
    - While it is correct to consider mosquitoes as vectors, mosquitoes are not usually attracted to biosolids. It might be best to eliminate the reference to mosquitoes here.
- Page 3 - Discussion of the 1990 GAO Report
    - It might be helpful to point out that this report was issued in the interim between issuance of the proposed and issuance of the final sludge regulations (40 CFR Part 503).
- Page 5 - Discussion of State Biosolids Issues
    - 1st paragraph, 3rd line: re-word the sentence tor read ". . . have received **formal** delegation from EPA." [New words are in **bold**.]
- Page 15 - Discussion of State Delegation
    - It would be more helpful to most readers if the references provided were to sections of the Clean Water Act rather than to sections of the United States Code.
    - You fail to point out that most state program requirements are now comparable or more restrictive that the Part 503 requirements, although you do include a quote from a member of the regulated community that "Many states also go beyond what is required in Part 503 with regard to management practices ..."
- Page 17 - top of page
    - We believe you may be referring to comments provided by Synagro Technologies, Inc. If so, check the date. Our copy is dated October 2, 2001. We're also aware that Synagro provided additional comments on November 13, 2001; you may want to address those

comments as well in your final report. Unless there's a specific reason for not doing so, we suggest you name the source of the comments.

- Page 18 - 1st full paragraph

    - Revise the paragraph to delete the reference to the Agency being practice-neutral with respect to biosolids management. The Agency does support beneficial reuse of biosolids, but it is the responsibility of local government to make local decisions regarding use and disposal options that are consistent with 40 CFR Part 503. As a result, we do not take an active role in choosing a specific use or disposal method.

- Page 18 & 19 - Discussion of Greg Kester's letters

    - Assistant Administrator Mehan answered Greg Kester's letter of September 10, 2001, on November 13, 2001. A copy of that response is attached.

    - There is no letter from Greg Kester dated October 2001. A letter Mr. Kester sent to Mike Cook in October 2000 may have been inadvertently dated 2001.

- Page 20 - 1st bullet concerning another joint meeting between States Headquarters, Regional Coordinators, and Regional Enforcement representatives

    - We expect to be able to provide funding for another annual biosolids meeting in 2002.

- Page 23

    - The meaning and intent of the last bullet on the page is not clear.

- Pages 28 - section titled "Water Environment Research Foundation"

    - 1st paragraph, 5th line ... the statement that "For each research project, a projects subcommittee (PSC) is formed of five to six outside experts typically from universities, municipalities, industry, and **sometimes** EPA" should be revised to add the "**sometimes**" since many of the WERF project PSC's have no EPA members. [New words are in **bold**.]

- Pages 29-36 - Discussion of the Science behind Part 503

    - The following supplement the red-line / strike out revision of this section which Al Rubin of OST provided to your staff of your [OIG] staff several weeks ago.

    - in the last paragraph of the section titled "Less Conservative Assumptions" you discuss the ORD allocation of $1 million for an ecological impact study which was begun in 1994 to address ecological effects, indicating that it was the only major study to address some of the research committed to in the Preamble. Actually, only a portion of the $1 million was ever allocated to the ecological impact study and additional funding was used to support hydrologic groundwater modeling efforts by the Athens R&D Lab that were eventually delivered to OST.

    - In the section on Class A vs. Class B Biosolids, the following statement (on page 35) is erroneous "These alternatives [Alternatives 3 and 4] have been criticized because the fact that certain indicator organisms are present or not present tells nothing about whether

there are other pathogenic organisms in the biosolids." The statement is erroneous because, for both alternatives, a demonstration must be made that there is an absence of Salmonella, Enteric virus, and viable helminth ova.

- There is a statement, on page 36, that reads, "In addition, endotoxins, toxic chemicals in bacteria which are not destroyed when bacteria are killed, also might be present in Class A biosolids." We believe you meant to say "... endotoxins and toxic chemicals in the biosolids which are not destroyed when bacteria are killed..."

Pages 36 / 37 - Discussion of Tracking and Investigating Health Complaints

- There are many errors in this discussion which should be corrected before you issue the final report. The errors are too numerous to address here. Call Bob Bastian (202-564-0653) for the details.

- Page 39 - very top of page
  - We suggest you consider naming the source of the comment.
  - Here you discuss and list county bans and restrictive ordinances, but fail to discuss the fact that at one time the State of New York had a 2 year moratorium on land application of biosolids (subsequently lifted), that there were a series of township bans passed in Wisconsin (subsequently overturned by the state).

- Page 41 in the section entitled Health Concerns
  - Here you discuss the NIOSH Hazard ID report and recommendations, but fail to mention that most of the NIOSH recommendations are routinely practiced by local POTWs and land application operations. You also fail to mention a follow-up article in the June/July'01 edition of *Water Environment Laboratory Solutions* (p.12-13). The article includes the following statement(s) "The LeSourdsville study misrepresents the facts, because the biosolids had pathogen levels exceeding Class B thresholds when workers experienced gastrointestinal problems. . . this key fact is missing in the reports and calls into question the legitimacy of claims based on them."

- Page 43 in the section entitled Economic Concerns
  - Here and elsewhere, you discuss the concerns of the California Farm Bureau, but fail to note that the Ohio Farm Bureau coordinated an in-depth study (in conjunction with the Ohio State University's Dept. of Pathobiology) of land application of Class B biosolids in Ohio, including an epidemiological study involving the general health of residents from 47 sludge-receiving farms compared with residents of 46 control farms for EPA/ORD's Water Engineering Research Lab. and Toxicology and Microbiology Div./Health Effects Research Lab. in Cincinnati (the final report *Demonstration of Acceptable Systems for Land Disposal of Sewage Sludge* was issued in 1985) that found the health of the farm families on farms receiving biosolids was as good if not better than the health of the control farm families.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

September 10, 2001

The Honorable Christine Todd Whitman, Administrator
USEPA
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Subject: Biosolids Management

Dear Administrator Whitman:

I am the state biosolids coordinator for Wisconsin, and by consensus represent states on EPA's Biosolids Program Implementation Team (BPIT) and other general biosolids issues. This letter has been reviewed by other state biosolids coordinators and is sent with their overwhelming consensus agreement and support. I am writing to request that the biosolids program within EPA be granted additional funding and personnel to effectively implement this overburdened program. Of EPA's $7.8 billion dollar budget in FY 2001, only about $4 million or **0.05%** was devoted to biosolids staff and the program. That includes a $1 million dollar Congressional appropriation to the National Biosolids Partnership. At the same time approximately **40%** of the cost of wastewater treatment is expended on sludge treatment and management. This inequity has far-reaching consequences and places beneficial use in severe jeopardy. Beneficial use is a critical link to long-term sustainable wastewater treatment across the nation. Likewise state agencies should be given clear directives and finances to increase oversight in the biosolids program.

We also request that EPA support its research and regulations by releasing a position statement to again acknowledge the benefits of recycling this material. EPA, FDA, and USDA published an inter-agency agreement in 1981 with further affirmation and clarification in both 1984 and 1991, which promoted beneficial use as the preferred disposition of biosolids as opposed to landfilling or incineration.

Since the Agency promulgated the federal regulations for the use and disposal of sewage sludge in Title 40 of the Code of Federal Regulations, Part 503 (40 CFR part 503) on February 19, 1993, the resources devoted to the program have steadily declined. The agency had initially taken the position that biosolids applied to land presented a low risk for adverse effects to either public health or the environment and thus lowered the priority of the program and the resources devoted to it. Recent public forum events and criticism should force the Agency to reconsider the low priority rating and reallocate resources and staff to this program. The events include:

- A Congressional Hearing before the Committee on Science chaired by Congressman Sensenbrenner held on March 22, 2000.

- An audit report completed by the Office of the Inspector General (OIG) in 2000, at the request of the Office of Water to help them assess the program. A response was issued in June 2001 in which it is stated that many of the recommendations will not be funded.

- A new audit by the OIG has recently commenced at the request of the Whistleblower program.

- A National Academy of Science (NAS) review that concluded in a 1996 report that the 40 CFR part 503 regulations are protective and sludge can be used for food production crops *provided there is effective oversight to ensure the regulations are followed.*

- A second NAS study has been initiated this year which is again re-evaluating the rule development process and the science on which the regulations were based to determine if they are still adequate to protect human health in light of new research (I am serving on this committee). This study is also examining pathogen control and whether a risk based approach for pathogens should be pursued.

In addition:

- There have been allegations (largely championed by an EPA employee in the Whistleblower program) of human death due to biosolids application in at least two states. The state public health officials in those cases have not found any connection to biosolids, but the accusations persist.

- Allegations of animal deaths in at least two states, numerous negative newspaper and other media reports, and an increase in public complaints and concerns about the land application of biosolids.

While none of the allegations have yet to stand the test of scientific scrutiny, they all must be investigated and a response provided.

All of the above illustrate the need for effective oversight of this program, and the need for continued research, so the public can be assured that regulations are followed, updated, and public health and the environment are protected. An Agency budget of far less than one-tenth of one percent is unacceptable and represents an impossibility to effectively administer any program. The following general recommendations are respectfully offered for immediate action:

1. Staffing levels must be increased within EPA for the biosolids management program. A budget must exist which will allow for technical support to be offered by EPA, to states and the public. Headquarters is operating with a skeletal staff and must be augmented with additional staff and a budget to administer an effective program. The Office of Research and Development must be staffed at a level sufficient to conduct research and answer the myriad questions posed on emerging pathogens, and other pathogen and vector attraction control issues. Regional coordinators are directed to devote from zero to very little time on biosolids management. Retirement and transfers loom for many in the program and the institutional knowledge lost will be irreplaceable. New staff must be integrated into the program while that staff is still available.

2. The Pathogen Equivalency Committee (PEC) is a non-funded invaluable resource within the Agency that must be formally recognized, work-planned for, and budgeted. This Committee provides technical support for countless regulatory and regulated professionals across the world.

3. EPA should provide positive direction to states that biosolids should be elevated as a priority program and make funds available to states for this purpose. All states have some level of

oversight for biosolids but generally need to increase the level of resources for better program implementation.

4. A positive initiative EPA has funded annually for the past three years is a grant to conduct a joint state and federal regulator biosolids workshop. This workshop has provided unique opportunities to discuss the relevant issues in biosolids management and to develop strategies for more effective implementation. We would cordially request your attendance at the next workshop tentatively scheduled for June 24 – 27, 2002 in the Washington, DC area.

5. More specific recommendations are contained in 4 earlier letters I have sent to the Agency, dated October and February 2000, and November and October, 1998. Recommendations contained in those letters are still seen as vital to the program. I would be happy to provide you copies of these letters.

It is recognized that you have inherited the situation in which this program finds itself. It is hoped that you will have the vision to take action to save this important recycling program now. Thank you very much for your consideration of these requests and please don't hesitate to contact me at (608) 267-7611 or via email at kesteg@dnr.state.wi.us, with any questions or to discuss these issues further.

Sincerely,

/S/

Greg Kester, P.E.
State Residuals Coordinator

cc: Tracy Mehan – Assistant Administrator for Water, USEPA
Mike Cook – Director, Office of Wastewater Management, USEPA
Biosolids Program Implementation Team
Regional Coordinators
State Residuals Coordinators

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 1 3 2001

OFFICE OF
WATER

Mr. Gregg Kester, P.E.
State Residuals Coordinator
State of Wisconsin, Department of Natural Resources
101 S. Webster Street
Madison, WI 53707-7921

Dear Mr. Kester:

Thank you for your letter of September 10, 2001, to Administrator Christine Todd Whitman. You wrote to request that the Agency devote more resources to the biosolids program and issue a position statement reaffirming its support of beneficia1 reuse.

The Agency has only finite resources to discharge a large number and variety of responsibilities to address risks to the nation's water resources. The challenge, of course, is to use the available resources to reduce risk to human health and the environment in the most effective ways possible. EPA also believes that, within its resource constraints, EPA can best contribute to beneficial reuse by maintaining scientific knowledge and risk assessment capabilities; setting, enforcing, and revising standards; and providing tools for decision-making at the watershed level.

EPA's responsibility under Section 405 of the Clean Water Act is to develop management practices and numerical criteria for biosolids that will protect public health and the environment. We believe that Part 503 Rule provides protective criteria for the three use and disposal options covered by that rule: land application, incineration, and land disposal. EPA generally supports beneficial reuse of biosolids, but it is the responsibility of local government to make local decisions regarding use and disposal options that are consistent with the Part 503 rule. As you know, in order to assure that the 503 rule continues to reflect sound science, the National Academy of Sciences is currently conducting a review of the basis of the rule. We expect the results of that review in the next year.

Thank you for the invitation to attend next year's biosolid workshop. While I cannot commit now to attend given the demands and uncertainty of my schedule, I do want to say we strongly support these very productive workshops.

I would like to express my appreciation for your work on the Biosolids Program lmplementation Team. The participation of State governments is extremely valuable and cooperative efforts between the States and the Environmental Protection Agency (EPA), are the backbone of many programs, including oversight at biosolids management. If you have further questions or comments, please call Michael B. Cook, Director, Office of Wastewater Management, at (202)-564-0748.

Sincerely,

/S/

G. Tracy Mehan, III
Assistant Administrator

Distribution

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Regional Biosolids Coordinators
Regional Audit Liaisons

National Research Council
National Institute for Occupational Safety and Health

State Biosolids Coordinators
The National Whistleblower Center
Synagro Technologies, Inc.

Requests for up to five copies of this report may be sent to:

U.S. Environmental Protection Agency
Headquarters Audit/Evaluation Resource Center (2443)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

This report is also available from the internet site:

http://www.epa.gov/oigearth/eroom.htm