EVALUATION OF STATE LEGISLATION BANNING YARD WASTE FROM LANDFILLS

By

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BANNING YARD WASTE

FROM LANDFILLS

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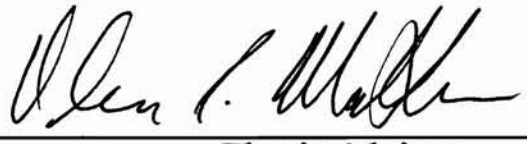

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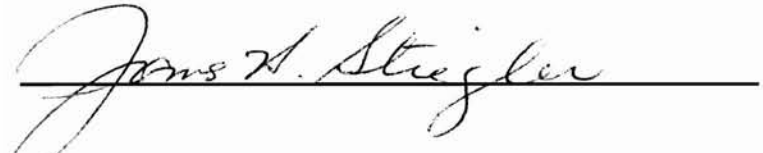

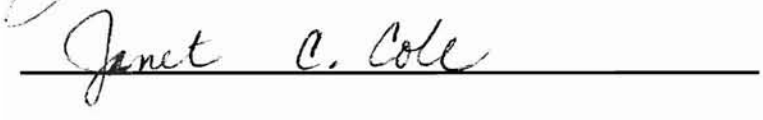

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CHAPTER ONE

INTRODUCTION, LEGISLATION HISTORY, AND SOLID WASTE STATISTICS

INTRODUCTION TO THE RESEARCH

This research will evaluate state solid waste reduction legislation that includes banning yard waste from landfills. Yard waste bans are a new form of waste reduction, and this research will provide guidelines for developing legislation that will be effective in solid waste reduction. Yard waste bans are being developed in many states, and since this type of legislation is new, a system will be developed for evaluating the present legislation for effectiveness. With this information, a model will be developed for strong and effective legislation that can be applied in a number of states.

Specific elements must be included in the legislation in order for it to be effective. A number of states with yard waste bans will be evaluated and graded in accordance with their inclusion of the specific elements that are important. From this, a model will be developed for other states to use.

This research starts with the background history of solid waste legislation at the federal level. This legislation is the catalyst for state solid waste management planning. The statistics behind the state of garbage in the United States over the last few years and how it has changed with the changes in legislation are included.

General Overview

A new trend in state legislation began about five years ago. This new trend has been to develop state waste reduction legislation to comply with stricter controls of landfill regulations set by the Environmental Protection Agency (EPA) through the Resource Conservation and Recovery Act (RCRA). The stricter controls are because of the increasing number of landfills on the Superfund cleanup list (30-50 percent) due to groundwater pollution and contamination from the landfills (Sloggett, 1994).

With stricter landfill regulations many landfills will close so states and communities are looking for ways to divert solid waste from landfills and incinerators by recycling products such as paper, aluminum, and plastic. In accordance with the RCRA legislation, states are compiling solid waste management plans to organize recycling and reuse programs. These plans are a way for the states to experiment through legislation to promote recycling and reuse of solid waste to divert it from the landfills.

Elements being considered include: state and local recycling programs; identifying alternative uses; implementing incentives or markets for recycled products; educational programs for the public on the reasons to recycle and methods of reusing solid waste; and financial assistance to encourage companies and cities to establish recycling programs. Other important elements are the establishment of target goals and dates for reduction of solid waste as well as fines and penalties to be incurred for noncompliance with the legislation.

Yard waste is a portion of the solid waste stream that has received increased scrutiny in the last five years. Yard waste is the second largest component in the nation's solid waste stream, topped only by paper

(Goldstein, 1989). An estimated 20 percent (by weight) of the materials sent to landfills or combustion facilities has been estimated by EPA to be leaves, grass clippings, brush, and other woody materials, collectively termed yard waste (Kashmanian, 1992). This research will look at state legislation which specifically bans yard waste from landfills.

The following diagram shows the composition of municipal solid waste in the United States by percentages. This E.P.A. data was adapted from Characterization of Municipal Solid Waste in the United States: 1993 Update.

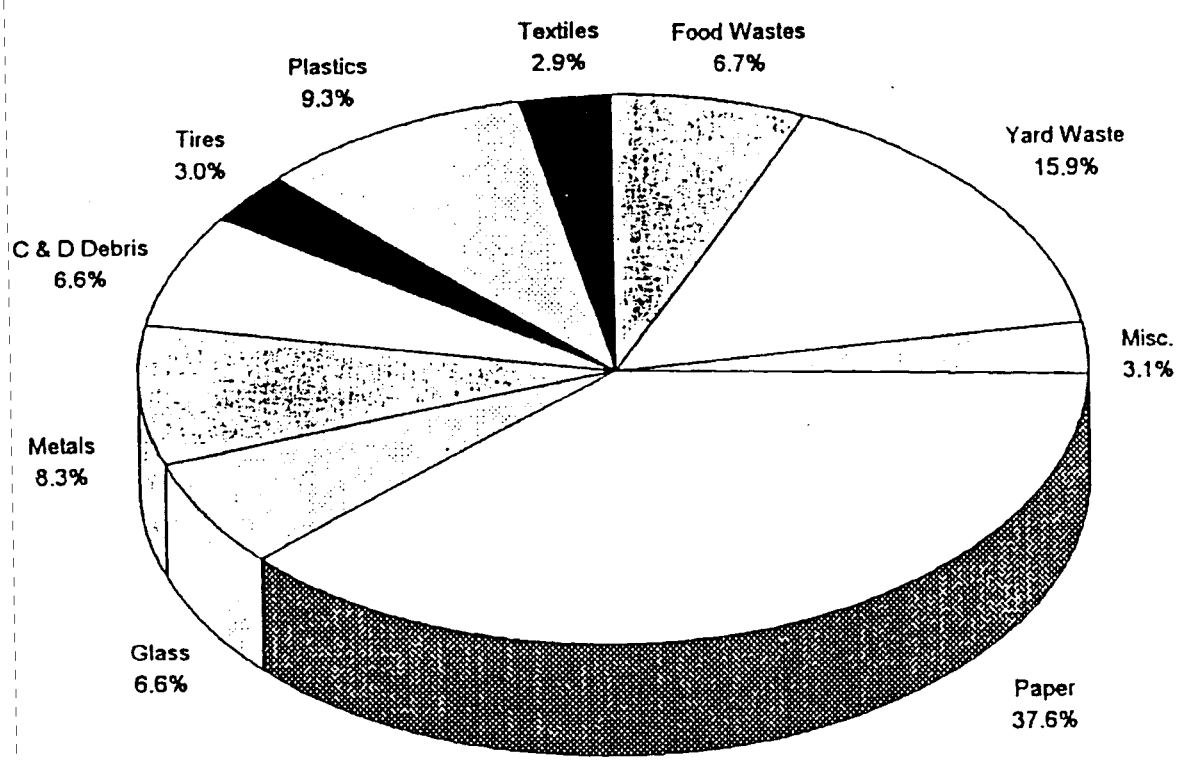

Figure 1: U.S. MSW Composition (206.9 million tons)
(1993-1994 Florida Solid Waste Management Report)

Federal Legislative History

The first significant Federal effort in solid waste management and resource recovery was initiated in 1965 with the passage of the Solid Waste Disposal Act (P.L. 89-272). It called for a research and development program and provided funds to the states for making surveys of waste disposal practices and for developing waste disposal plans. The Resource Recovery Act of 1970 (P.L. 91-512) broadened the research and development approach to include major demonstrations and shifted the emphasis from disposal to recovery of materials and to converting solid wastes to energy. It also required the (EPA) to issue guidelines on waste management and recovery which are mandatory for federal agencies, but merely advisory to others.

In April 1975, the Committee on Interstate and Foreign Commerce held hearings on solid waste legislation at which witnesses endorsed comprehensive legislation which established state solid waste management programs, eliminated freight rate discrimination, reduced the volume of waste before entering the solid waste stream, controlled hazardous wastes, and continued technical assistance, research and development. The need for private sector involvement in the resource recovery efforts of communities was emphasized, and tax incentives of various types were requested to stimulate recovery and reuse.

Environmental research and development are under the jurisdiction of the Committee on Science and Technology, which held hearings in April 1976 on the Solid Waste Energy and Resource Recovery Act, H.R. 12380. Testimony ranged broadly over the subject of solid waste management and resource recovery.

Pursuant to Rule X, clause 2 (b) (2) of the Rules of the House of Representatives oversight findings and recommendations were received. The findings of fact and recommendations are summarized as follows:

Findings of Fact

1. Solid waste disposal is one of the most serious municipal problems; the problem is growing at an annual rate of nearly 8 percent.

2. Open dumps create health and environmental hazards.

3. Sanitary landfill disposal of municipal solid waste is the most commonly used disposal technique.

4. Properly managed landfill disposal of refuse can be inexpensive and environmentally sound.

5. Technology whereby materials and energy are recovered from refuse is available.

6. Environmental, social, and economic benefits of resource recovery have been demonstrated in Europe and to a limited extent, in the United States.

7. A number of new, or until now undemonstrated, technologies are in various stages of development and demonstration in the United States.

8. The federal program, which is largely based on the Resource Recovery Act of 1970, is essentially a non-regulatory program of EPA intended to provide technical assistance to communities and encourage the development of new technology through limited research, development, and demonstration.

9. Neither EPA nor any other federal agency has authority to establish standards governing solid waste management or resource recovery.

10. Banks and lending institutions have financed municipal resource recovery systems and are willing to invest in such systems if such systems can be shown to be reliable and economically viable.

Recommendations

1. Congress should consider legislation authorizing minimum national standards for the disposal of solid waste. Such standards should take into account the health hazards and environmental degradation associated with inadequately controlled landfill disposal of refuse and to the maximum extent possible, take into account the environmental and economic costs and benefits of landfill disposal and the availability and feasibility of alternative systems.

2. Congress should consider including in such legislation a requirement that open dumping of refuse be prohibited after a certain date. That date should allow communities a reasonable time within which to initiate systems which meet the national standards of municipal solid waste disposal.

3. Congress should consider including in such legislation direction that the Environmental Protection Agency, in consultation with the Energy Research and Development Administration, develop and issue such national standards of municipal solid waste disposal within one year from the date of enactment of such legislation.

4. Congress should consider including in such legislation provision for penalties against any community which fails to meet the national standards of municipal waste disposal or which permits open dumping after the date specified in such standards and prohibition.

5. The EPA should expand the scope and quality of its technical assistance to states, regions, and municipalities to aid in the development of environmentally, technically, and economically sound solutions to municipal solid waste problems.

6. The EPA, in consultation with representative of states, municipalities, private industry, and other federal agencies, should develop recommended standards for state programs of solid waste management.

7. Congress should consider appropriating funds for limited federal assistance to the states to assist them in the development of state-wide programs.

8. Congress should consider adopting legislation which directs that the resource recovery research and development efforts of the EPA and the Energy Research and Development Administration be merged or very closely coordinated.

From the findings and recommendations, the Resource Conservation and Recovery Act (RCRA) was written and passed as P.L. 94-580. It amended and completely revised the Solid Waste Disposal Act. The objectives of RCRA were to protect human health and the environment, conserve valuable materials, and produce energy from discarded materials by establishing a cooperative effort between the federal government and state governments.

HISTORY OF FEDERAL SOLID WASTE LEGISLATION

P.L. 94-580 RCRA of 1976

The titles of RCRA most relevant to yard waste includeTitle IV and Title V. Title IV provides the guidelines for the state or regional discarded materials plan. Title V provides for the commercialization of proven resource recovery technology, stimulation of market development for recovered materials, promotion of proven technology, and a forum for the exchange of technical and economic data relating to such facilities.

Title IV - State or Regional Discarded Material Plans

The objectives of this section are to assist states in developing methods of disposal of discarded materials which are environmentally sound and maximize resource conservation and recovery of the nation's resources. The objectives are to be accomplished through federal financial and technical assistance, comprehensive planning, and cooperation among all levels of government.

The Administrator is to publish guidelines identifying areas which have common discarded materials problems and are appropriate units for planning the management of such problems. The administrator will also issue guidelines to assist the state in developing and implementing their discarded materials plan. The guidelines are to be reviewed from time to time but not less frequently than every three years.

The State Plan Guidelines will consider:

- Regional, geographic, hydrologic, climatic, and other conditions, and circumstances under which discarded material practices are operated and reasonable protection of the quality of ground and surface waters from leachate contamination.
- Characteristics and conditions of collections, storage, processing, and the disposal of discarded materials and the location of such facilities and the operations conducted.
- Methods for closing and upgrading open dumps for the purposes of eliminating health hazards.
- Population density.
- The types and locations of transportation within the state.
- Profile of industries within the state.
- Constituents and generation of waste within the state.
- Political, economic, organizational and financial problems effecting discarded material management.
- Types of resource recovery facilities which would be appropriate.
- Available new and additional markets for recovered materials.

Minimum requirements for approval of the State Plan are:

- Identify the responsibility of state, local and regional authorities in the planning and implementation of the state plan.
- Distribution of federal funds to such states is reallocated among the state, local and regional authorities according to the responsibility at each level of government.
- There is a means of coordinating regional and local plans with state plans.
- There shall be a prohibition on the establishment of new open dumps, and that all discarded materials must be utilized by a resource recovery facility or disposed of in a sanitary landfill, or otherwise disposed of in an environmentally sound manner.
- There must be a plan to close or upgrade all existing open dumps.
- The state must establish regulatory powers to carry out the discarded materials plan.

No later than one year after enactment of the Act and after notice and public hearings and consultation with the states, the Administrator is required to develop criteria for determining which facilities are to be classified as sanitary landfills and which are to be classified as open dumps. At a minimum a site can be classified as a sanitary landfill only if there is no reasonable probability of adverse effects on health or the environment from the disposal of discarded material at such site. It will now be required that all disposal on land be in sanitary landfills. Open dumps are to be eliminated at the rate of 20 percent each year, with those posing the greatest degree of health and environment hazards eliminated first.

Other sections of Title IV include the procedure for development and implementation of the State Plan, approval of the State Plan, and

federal assistance. Forty million dollars was authorized for fiscal year 1978 and fifty million dollars for fiscal year 1979. States are given grants for the development and implementation of state plans under this title. This will help states implement education and alternative uses of yard waste before the bans take effect.

Title V - Duties of the Secretary of Commerce in Resource Conservation and Recovery

The Secretary of Commerce is required to encourage greater commercialization of proven resource recovery technology by providing accurate specifications for the use of recovered materials, stimulating and developing markets for recovered materials, promoting proven technology, and exchanging technical and economic data relating to such facilities.

Within two years of enactment the Secretary of Commerce is directed to identify the geographical locations of existing or potential markets for recovered materials and the economic and technical barriers to the uses of recovered materials. In addition, the Secretary is to encourage the development of new uses for recovered materials, evaluate the commercial feasibility of resource recovery facilities, publish the results of such evaluation, and develop a data base to assist persons in choosing a resource recovery technology.

The Secretary of Commerce will sponsor meetings for the exchange of information concerning all aspects of discarded material management, including patents, technology, and processes. Records are to be kept of the meetings and communication among participants. Actions taken to carry out any agreement for the exchange of information under this

section will not be considered a violation of federal antitrust law or any similar state law.

The effort to collect and reuse yard waste will be more feasible if commercialization of resource recovery and stimulated markets for yard waste or compost are in place. The transition to reuse yard waste will be much easier with proven technology, technical and economic data relating to composting facilities available in a data base.

P.L. 98-616 Hazardous and Solid Waste Amendments of 1984

In 1984 RCRA was amended. Two significant changes occured. Federal agencies were encouraged to use recycled goods to promote marketability and detailed studies were to be conducted on methods to extend the useful life of sanitary landfills. The studies were to address methods to reduce the volume of waste as well as innovative uses for closed landfill sites.

Title V - Provisions Relating to Several Subtitles of the Solid Waste Disposal Act

This section provides for the use of recovered materials by federal agencies. Yard waste reuse and composting by federal agencies will help to stimulate a market for yard waste products and encourage similar programs within state agencies. Within one year after the date of publication of applicable guidelines, each procuring agency shall develop an affirmative procurement program which will assure that items composed of recovered materials will be purchased to the maximum

extent practicable and which is consistent with applicable provisions of federal procurement law.

Each affirmative procurement program required under this subsection shall, at a minimum contain:

- A recovered materials preference program.
- An agency promotion program to promote the preference program adopted
- A program for requiring estimates of the total percentage of recovered material utilized in the performance of a contract
- Annual review and monitoring of the effectiveness of an agency's affirmative procurement program.

Title VII - Other Provisions

Section 702 amends section 8002 of the Solid Waste Disposal Act. The Administrator is to conduct detailed, comprehensive studies of methods to extend the useful life of sanitary landfills and to better use sites in which filled or closed landfills are located. Such studies shall address:

- Methods to reduce the volume of materials before placement in landfills.
- More efficient systems for depositing waste in landfills.
- Methods to enhance the rate of decomposition of solid waste in landfills, in a safe and environmentally acceptable manner.
- Innovative uses of closed landfill sites, including use for energy production such as solar or wind energy and use for metals recovery.

Federal solid waste legislation provides the guidelines and includes all the elements the states need to develop solid waste management

plans. The federal government will provide accurate specifications for use of recovered resources such as yard waste. Markets will be developed and stimulated through proven technology and the use of recovered materials by federal agencies by affirmative procurement programs. Studies to extend the landfills life will provide adequate time for recycle, reduce, and reuse programs to be put in place by states. Most importantly, the federal government will provide money to states through grants and loans to help with development and implementation of state solid waste management plans.

Nationwide Survey (BioCycle)

Reduction in Landfills

BioCycle conducted a survey at the end of 1988 and found there were just under 8,000 landfills operating in this country. By the end of 1994, that figure had dropped almost 55 percent to 3,558 (Steuteville, April, 1995). The trend has been a steady decline.

There were 6,326 landfills operating at the end of 1990. In 1991 it dropped to 5,812 operating landfills and in 1992 there was a decrease to 5,386 (Glenn, 1992). The number of landfills accepting municipal solid waste (MSW) continues to plunge. By the end of 1993 there were 4,482 (Steuteville, April, 1994) and in 1994 that number dropped to 3,558.

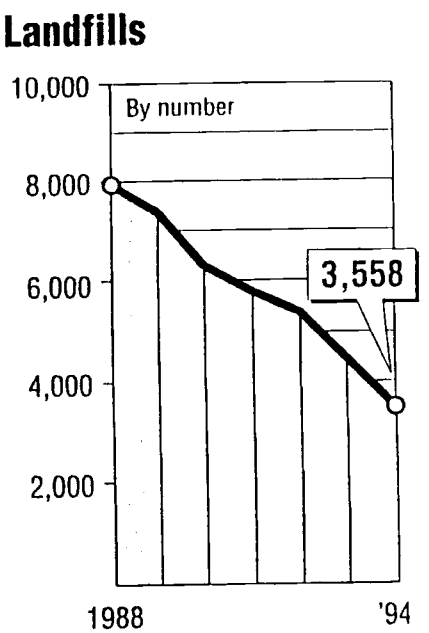

Figure 2: Number of Landfills in 1994 (Steuteville, 1995)

The decline in the number of landfills will not taper off soon. A number of states have indicated that many MSW landfills cannot meet the new federal regulations. In Mississippi, it is estimated that 60 of the 75 operating landfills will not be upgraded to meet the RCRA standards. Kansas officials estimate that when RCRA standards are enforced, its

current forecasted capacity of 30 years could be reduced to between three and five years (Glenn, 1992).

The Oklahoma landfill situation has changed dramatically since 1991. In Oklahoma in 1991 there were approximately 110 landfills. Currently there are 37 with most of these being privately owned (Rood, 1994). Figure 3 shows the locations of Oklahoma landfills.

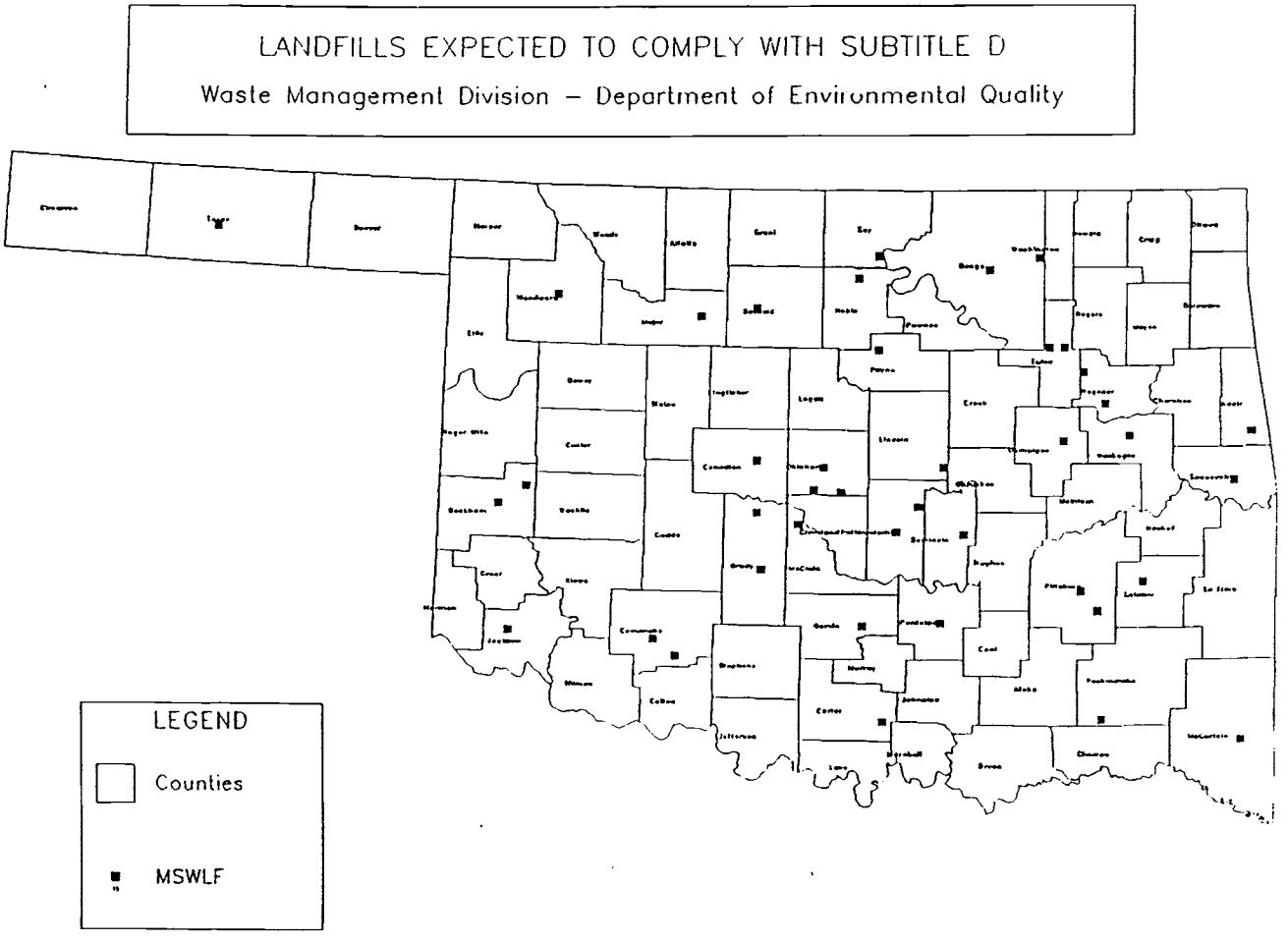

Figure 3: Location of existing landfills in Oklahoma. (Rood, 1994)

Curbside Recycling

Diverting material from landfills remains a top priority in many parts of the country. Many states are developing their own waste reduction legislation. This has caused a shift away from landfilling. In 1990, almost 84 percent of municipal solid waste was landfilled. By the end of 1991, that figure had decreased to 76 percent. In 1992, approximately 72 percent of the solid waste was landfilled and there was a decrease of 1 percentage point to 71 percent in 1993 (Steuteville, April, 1994). In 1994, only 67 percent of solid waste was landfilled (Steuteville, April, 1995).

The bulk of that reduction has been accounted for by recycling, which has increased from under 9 percent in 1989 to approximately 14 percent in 1991 (Glenn, 1992). The nationwide recycling rate at the end of 1992, which included composting of yard trimmings, was 17 percent (Steuteville, 1993). This number increased again in 1993 to 19 percent recycled (Steuteville, April, 1994) and up to 23 percent in 1994 according to the latest *BioCycle*'s annual "State of Garbage in America" survey.

There has been phenomenal growth in the number of curbside recycling programs operating in the United States. At the end of 1988, there were just under 1,000 such programs. In 1991 the total was just under 4,000 curbside programs (Glenn, 1992). The 1993 nationwide survey "State of Garbage in America" from *BioCycle* shows that curbside recycling programs continue their impressive growth pattern. Every region reported an increase in the number of programs, with the midwest having the largest growth rate (290 percent). Only three states report having no curbside collection service (Steuteville, May 1993).

The number of curbside recycling programs rose by 38 percent in 1992--from 3,912 to 5,405. For the first time, they exceeded the number of landfills (5,386) reported to *BioCycle* (Steuteville, May, 1993). This figure rose another 20 percent in 1993 to 6,678 curbside recycling programs as cities and towns added curbside collection and federal regulations forced a rash of landfill closures (Steuteville, April, 1994).

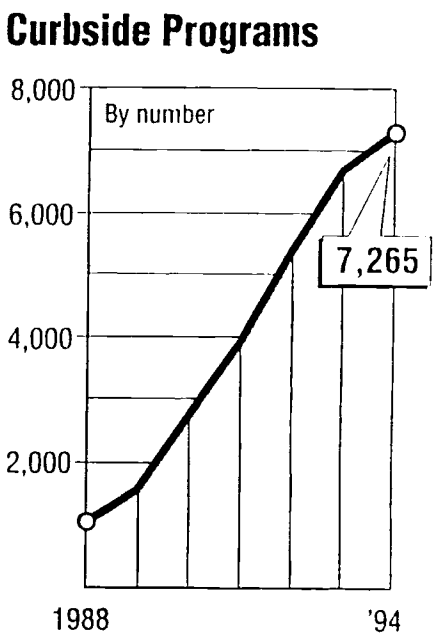

Figure 4: Number of curbside programs in the United States in 1994. (Steuteville, 1995)

The number of curbside recycling programs increased by nine percent in 1994 to 7,265. Table 1 shows residential recycling by state. It includes the number of curbside programs in each state, the population the program serves, and the primary method of service. Curbside recycling now serves an estimated 108 million people, which is about 41 percent of the U.S. population (Steuteville, April, 1995).

Table 1: Curbside Programs by State.

State	Curbside Programs	Curbside Population Served	Primary Methods: Commingled Curbside	Primary Methods: Source Sep. Curbside	Primary Methods: Dropoff
Alabama	30-40	700,000	X	X	X
Alaska	0	–	n/a	n/a	n/a
Arizona	27	880,000			X
Arkansas	20	350,000			X
California	496	17,850,000	X	X	
Colorado	70	700,000		X	X
Connecticut	169	3,056,000	X		
Delaware	1	5,000			X
Dist. of Columbia	1	312,000	X		
Florida	366	9,357,000	X		
Georgia	129	1,750,000	X		
Hawaii	0	–			X
Idaho	5	200,000		X	
Illinois	435	6,000,000	X	X	
Indiana	82	1,140,000	X		
Iowa	500	1,400,000		X	
Kansas	15	n/a			X
Kentucky	55	660,000	n/a	n/a	n/a
Louisiana	28	284,000	X		X
Maine	64	400,000			X
Maryland	95	2,880,000	X		
Massachusetts	141	4,200,000	X		X
Michigan	192	2,185,000		X	X
Minnesota	674	3,300,000		X	
Mississippi	20	400,000	X		
Missouri	122	n/a			X
Montana	2	n/a			X
Nebraska	11	391,000			X
Nevada	7	625,000		X	
New Hampshire	30	276,000			X
New Jersey	530	7,200,000	X		
New Mexico	8	535,000	X		X
New York	399	11,849,000	X		
North Carolina	247	3,100,000		X	X
North Dakota	23	100,000		X	X
Ohio	246	3,600,000	X	X	X
Oklahoma	6	n/a			X
Oregon	117	1,500,000		X	
Pennsylvania	761	8,518,000	X		
Rhode Island	22	803,000	X		
South Carolina	28	250,000			X
South Dakota	1	7,000			X
Tennessee	40	450,000	n/a	n/a	n/a
Texas	120	3,000,000	X		X
Utah	12	500,000			X
Vermont	78	254,000	X	X	X
Virginia	64	1,600,000	n/a	n/a	n/a
Washington	100	2,000,000	X	X	
West Virginia	67	500,000	X		
Wisconsin	600	3,000,000	X		
Wyoming	4	20,000			X
TOTAL	**7,265**	**108 million**			

(Steuteville, 1995)

Regionally, the bulk of the curbside programs are concentrated in the mid-Atlantic and Great Lakes states, with approximately 2,530 programs. This accounts for almost two-thirds of all curbside programs. The Rocky Mountain states have the lowest number of programs (Glenn, 1992).

Composting of Yard Waste

Yard waste, which comprises an average of 18 to 20 percent of MSW by weight, is a prime target for waste reduction initiatives (Deyle, 1991). Yard waste is the one component of the municipal waste stream that is being composted with relative success.

By the end of 1991, there were at least 2,201 facilities composting some part of the yard waste stream. That figure is 56 percent higher than the 1,407 known sites recorded in the survey from the previous year (Glenn, 1992). The number of facilities composting leaves, grass, brush, and other yard trimmings increased from 2,201 in 1991 to 2,981 in 1992.

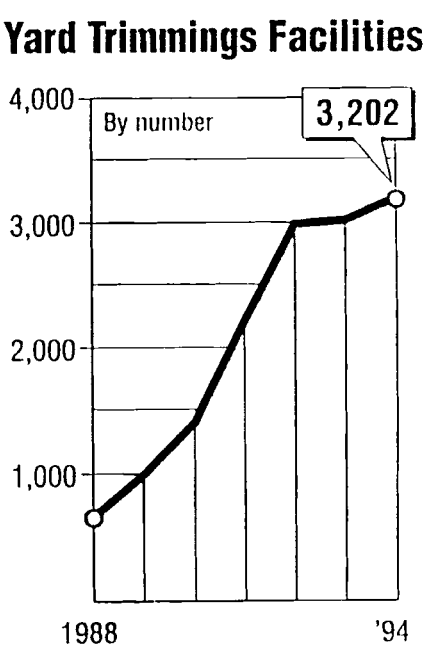

Figure 5: Yard Trimming Facilities in the United States in 1994. (Steuteville, 1995)

Additionally, there were 21 solid waste composting facilities in operation as of November, 1992 (Steuteville, May, 1993). In the 1993 survey, there was an increase of 780 composting facilities.

For the first time since *BioCycle* began tracking composting facilities for yard trimmings, the 1994 survey found little change in the number. There were 3,014 facilities for leaves, grass and brush reported nationwide, an increase of 33 from the year before (Steuteville, April, 1994). A total of 3,202 yard trimmings composting facilities were reported nationwide in the 1995 survey (Steuteville, April, 1995).

The increase of yard waste composting facilities is due to the implementation of numerous disposal bans by individual states. As of 1989, *BioCycle* reported that there were 10 states with legislative bans on the disposal of leaves and/or all yard waste in landfills. There are now 27 states, including the District of Columbia, with legislative bans on yard waste.

The impact of yard materials composting will continue to be the subject of debate. The EPA did a study estimating that yard trimmings make up an average of 18 percent of MSW nationwide. Even though at least 27 states have disposal bans for yard materials in effect, none are yet estimating a diversion close to that percentage. Home composting and mulching mowers are becoming more popular, but their effect is hard to measure. Further study is needed to determine the quantity of yard trimmings that remain in the MSW stream after disposal bans and diversion programs are in place (Steuteville, April, 1994). Table 2 shows each state and its methods of yard waste management.

Table 2: Yard Trimming Management

State	Composting Facilities	Land Application	Mulching	Primary Methods
Alabama	20-30		X	n/a
Alaska	1			n/a
Arizona	15		X	Mulch
Arkansas	30	X	X	Compost
California	14	X	X	n/a
Colorado	11			Compost
Connecticut	84	X	X	Mulch
Delaware	2			n/a
Dist. of Columbia	1			Compost
Florida	37		X	Mulch
Georgia	80		X	n/a
Hawaii	4			Compost
Idaho	16			n/a
Illinois	95	X		Compost
Indiana	60	X	X	Land ap.
Iowa	30	X	X	Compost
Kansas	40			Compost
Kentucky	40	X	X	Mulch
Louisiana	8			n/a
Maine	52			Compost
Maryland	13	X	X	Compost
Massachusetts	333	X		n/a
Michigan	100-150	X	X	Compost
Minnesota	426	X	X	Mulch[6]
Mississippi	8			n/a
Missouri	80		X	Compost
Montana	15		X	Mulch
Nebraska	15	X	X	Compost, Land ap.
Nevada	0		X	Mulch
New Hampshire	150			Compost
New Jersey	184	X	X	Compost
New Mexico	15	X	X	Compost, Mulch
New York	210	X	X	Compost
North Carolina	151	X	X	Compost, Mulch
North Dakota	25	X	X	Compost
Ohio	210	X	X	Compost
Oklahoma	4			Compost
Oregon	21		X	Compost
Pennsylvania	151	X	X	Compost
Rhode Island	19	X		Compost
South Carolina	56			Compost
South Dakota	10	X	X	Compost
Tennessee	15		X	Mulch
Texas	80	X	X	Compost, Mulch
Utah	5			Compost
Vermont	19	X	X	n/a
Virginia	22			n/a
Washington	21		X	Compost
West Virginia	1		X	Mulch
Wisconsin	165	X	X	Compost
Wyoming	8		X	Compost, Mulch
Total	3,202			

(Steuteville, 1995)

Not all states are trying to achieve landfill diversion of yard waste via legislative bans. New York, for example, uses a combination of incentives, including financial assistance grants and permit requirements. In 1988, Massachusetts gave out over $600,000 in grants to help communities pay for equipment and start-up costs for leaf composting (Goldstein, 1990).

California recently passed comprehensive recycling legislation but chose not to establish a ban on landfilling yard waste. The legislation set recycling goals of 25 percent by 1995, and 50 percent by the year 2000. California legislators believe these goals can be achieved by combining source reduction, recycling, and composting. There will be financial assistance in the form of grants, loans, and tax incentives for equipment purchases to get composting programs underway (Goldstein, 1990).

Many states have enacted solid waste management legislation but have not included a ban on landfilling yard waste. Many of these states are providing financial assistance grants for starting backyard composting programs. The state of Washington formed a Market Development Committee that is evaluating how to improve markets for source separated materials, including yard waste compost (Goldstein, 1990). Table 3 shows each state and their recycling market development programs and jobs created.

Table 3: Recycling Market Development Programs and Jobs Created

State	Tax Incentive	Commerce/Trade Department Involvement	Council/ Task Force	Jobs
Alabama			x	
Arizona	x	x	x	
Arkansas	x		x	
California	x			18,000
Colorado	x	x		
Connecticut			x	4,261
Delaware	x	x		1,281
District of Columbia				208
Florida	x	x	x	
Georgia			x	
Hawaii		x		
Idaho	x			
Illinois	x			
Indiana	x	x		
Iowa	x	x		
Kansas	x	x		
Kentucky	x	x	x	
Louisiana	x	x		
Maine	x			9,000
Maryland	x	x	x	
Massachusetts				10,000
Michigan		x		
Minnesota	x		x	
Mississippi		x	x	
Missouri		x	x	
Montana	x			
Nebraska		x		
Nevada	x			
New Hampshire			x	2,500
New Jersey	x			13,500
New Mexico	x			
New York		x		21,792
North Carolina	x	x	x	8,867
North Dakota	x			200
Ohio		x	x	
Oklahoma	x	x		6,500
Oregon	x	x	x	
Pennsylvania		x	x	40,893
Rhode Island				378
South Carolina			x	
Tennessee			x	
Texas	x	x	x	
Vermont				1,700
Virginia	x		x	
Washington		x	x	
West Virginia	x			
Wisconsin	x		x	
Wyoming		x		

(Steuteville, 1995)

Federal Composting Act

Composting has gained nationwide attention. National legislation, HR 2292, gained support in the U.S. House of Representatives during the last Congress but did not pass. The bill was introduced on May 26, 1993, by Rep. George Hochbruecker (D-N.Y.). The bill was called the Executive Composting Act, HR 2292. It requested that the president of the U.S. and governors of each state 1) begin on-site composting of organic materials generated at their residences and grounds, and 2) distribute the resulting compost to visitors and local residents for use in gardens or other appropriate purposes. A copy of this bill was provided by The Composting Council in Alexandria, Virginia and is attached in Appendix A.

State Bans of Yard Waste

State legislatures continue the practice of banning specific materials from disposal into landfills including yard waste. A total of 44 states now have some type of disposal ban in place. By the end of 1992, 22 states had adopted bans on the disposal of leaves, brush, grass clippings, and other yard trimmings in landfills (Steuteville, June 1993). One advantage to a ban is that states have compliance mechanisms available to enforce the policy. Other states are relying more on encouragement than enforcement (Goldstein, 1990).

For example, the Georgia legislature adopted a landfill ban on yard trimmings in the 1993 session. South Carolina, which passed a disposal ban on yard materials in 1991, extended the date of implementation from

August, 1992 to May, 1993. In the interim, the state developed composting regulations, which took effect in April, 1993. Arkansas, with a ban set for July, 1993, took steps in the 1993 legislative session to extend the deadline. Now the mandate will be phased in. Landfills must decrease the amount of yard materials accepted by 50 percent in 1993, 75 percent in 1994, and 95 percent in 1995 (Steuteville, June, 1993). Table 4 shows the latest data on the states with legislation banning yard waste from landfills.

Table 4: The latest data of states with yard waste bans.

STATE	LEGISLATION	DESCRIPTION	EFFECTIVE DATE
Alabama	Act No. 90-567	All state funded agencies must recycle yard waste; 10% of the 1995 25% diversion goal can come from composting and mulching.	Jan. 1991
Arkansas	Act 479 SB 420	Leaves, grass, brush, and tree prunings are banned from landfills	50% - July 1993
Connecticut	PA-90.220 PA-93-423, H 5922	Leaves must be composted. Household grass clippings may not be disposed of at resource recovery facilities or solid waste facilities.	Jan. 1991 Oct. 1995
District of Columbia	N.A.	Yard waste banned from landfills.	Oct. 1989
Florida	SB 1192	Yard waste banned from landfills.	Jan. 1992
Georgia	Solid Waste Management Act of 1990/ HB 257	Cities, counties, and solid waste management authorities shall require that yard trimmings be source-separated and banned from disposal at municipal solid waste facilities.	Sept. 1996
Illinois	PA-86-1430	Yard waste banned from landfills.	July 1990
Indiana	S 25	Yard waste must be source-separated. Vegetative matter from landscaping and land clearing projects banned from landfills.	June 1994 Sept. 1994
Iowa	HF 753	Yard waste banned from landfills, Yard waste must be source-separated.	Jan. 1991
Maryland	H 1088	Source-separated yard waste banned from refuse disposal systems, unless the waste is to be composted or mulched.	Oct. 1992
Massachusetts	by Regulation	Leaves banned from landfills. Yard waste banned from landfills.	Dec. 1991 Dec. 1992

Michigan	PA 264	Yard waste from state and municipal land banned from landfills. Yard waste banned from landfills.	March 1993 March 1994
Minnesota	115A.931	Yard waste banned from landfills.	Jan. 1992
Missouri	SB 530	Yard waste banned from landfills.	Jan. 1992
Nebraska	LB 127	Yard waste banned from landfills; source-separated yard waste may be accepted by a landfill for soil conditioning or composting.	Sept. 1994
New Hampshire	HB 646-FN	Yard waste banned from landfills and waste-to-energy facilities.	July 1993
New Jersey	PL 1987, C. 102	Leaves banned from landfills.	Sept. 1988
New York		Yard waste must be source-separated if economically feasible.	Sept. 1992
North Carolina	HB 111	Yard waste banned from sanitary landfills.	Jan. 1993
Ohio	HB 592	Yard waste banned from landfills.	Dec. 1993
Oregon	SB 66	Yard waste should be collected and composted; home composting should be promoted.	July 1992
Pennsylvania	101	Truckloads consisting primarily of leaves banned from landfills and waste-to-energy facilities.	Sept. 1990
South Carolina	South Carolina Solid Waste Policy and Management Act	Yard waste must be source separated. Yard waste banned from landfills unless it is to be composted.	May 1993
South Dakota	HB 1001	Yard waste banned from landfills.	Jan. 1995
Virginia	HB 198	Any county, city, or town may ban leaves or grass clippings from landfills.	Jan. 1995
West Virginia	SB 18	Yard waste banned from landfills.	June 1993
Wisconsin	SB 296	Yard waste banned from landfills.	Jan. 1993

(Sheehan, 1994)

The following two tables compare the waste generated and disposed of by states with waste recycling/reduction goals. Table 5 will show waste generation, recycling and disposal methods of each state. Table 6 will show statewide solid waste recycling/reduction goals of each state and whether the goal is for recycling/diversion or waste reduction.

Table 5: Waste Generation, Recycling and Disposal Methods by State

State	Solid Waste (tons/yr)	Recycled (%)	Incinerated (%)	Landfilled (%)
Alabama	5,310,000	15	5	80
Alaska	500,000	6	15	79
Arizona	4,200,000	5	0	95
Arkansas	2,154,000	25	5	70
California	45,000,000	25	2	73
Colorado	2,800,000	18	1	81
Connecticut	2,905,000	23	63	14
Delaware	1,100,000	27	13	60
Dist. of Columbia	900,000	25	50	25
Florida	23,561,000	36	23	41
Georgia	8,500,000	12	3	85
Hawaii	2,000,000	17	31	52
Idaho	886,000	10	0	90
Illinois	15,000,000	19	2	79
Indiana	5,600,000	19	12	69
Iowa	2,744,000	16	0	84
Kansas	3,500,000	8	0	92
Kentucky	3,750,000	15	0	85
Louisiana	3,323,000	8	0	92
Maine	1,293,000	33	39	28
Maryland	5,200,000	26	23	51
Massachusetts	6,750,000	32	48	20
Michigan	13,700,000	20	10	70
Minnesota	4,600,000	44	23	33
Mississippi	2,200,000	11	3	86
Missouri	5,600,000	17	0	83
Montana	790,000	6	2	92
Nebraska	1,650,000	19	0	81
Nevada	2,420,000	17	0	83
New Hampshire	1,032,000	16	26	58
New Jersey	7,400,000	41	23	36
New Mexico	1,880,000	9	0	91
New York	25,400,000	28	19	53
North Carolina	7,754,000	8	1	91
North Dakota	500,000	18	0	82
Ohio	22,543,000	32	4	64
Oklahoma	2,500,000	12	10	78
Oregon	3,255,000	30	6	64
Pennsylvania	9,500,000	20	19	61
Rhode Island	1,062,000	24	0	76
South Carolina	5,100,000	9	5	86
South Dakota	840,000	20	0	80
Tennessee	6,000,000	15	7	78
Texas	25,026,000	14	1	85
Utah	2,000,000	13	7	80
Vermont	700,000	28	4	68
Virginia	8,000,000	28	18	54
Washington	6,513,000	38	6	56
West Virginia	2,000,000	12	0	88
Wisconsin	5,434,000	28	3	69
Wyoming	504,000	5	0	95
Total	**322,879,000**	**23%**	**10%**	**67%**

(Steuteville, 1995)

Table 6: Statewide Solid Waste Recycling/Reduction Goals

State	Goal(%)	Deadline	Type of Goal: Recycling/ Diversion	Type of Goal: Waste Reduction
Alabama	25	-	x	
Arkansas	40	2000	x	
California	50	2000	x	
Colorado	50	2000	x	
Connecticut	40	2000	x	
Delaware	21	2000	x	
Dist . of Columbia	45	1995	x	
Florida	30	1995	n/a	n/a
Georgia	25	1996		x
Hawaii	50	2000	x	
Idaho	25	1995	x	
Illinois	25	2000	x	
Indiana	50	2000		x
Iowa	50	2000		x
Kentucky	25	1997		x
Louisiana	25	1992	x	
Maine	50	1994	x	
Maryland	20	1994	x	
Massachusetts	46	2000	x	
Michigan	50	2005	x	
Minnesota	30-45	1996	x	
Mississippi	25	1996		x
Missouri	40	1998		x
Montana	25	1996		x
Nebraska	50	2002		x
Nevada	25	1994	x	
New Hampshire	40	2000		x
New Jersey	60	1995	x	
New Mexico	50	2000	x	
New York	50	2000	x	
North Carolina	40	2001		x
North Dakota	40	2000		x
Ohio	25	1994	x	
Oregon	50	2000	x	
Pennsylvania	25	1997	x	
Rhode Island	70	-	x	
South Carolina	30	1997	x	
South Dakota	50	2001		x
Tennessee	25	1996		x
Texas	40	1994		x
Vermont	40	2000	x	
Virginia	25	1995	x	
Washington	50	1995	x	
West Virginia	50	2010	n/a	n/a

(Steuteville, 1995)

Markets for Recycling and Composting

Market Potential and Development

States - those with and without bans - have included market development provisions within their solid waste management policies. One example is the Iowa legislation that states that all agencies should give preferences to compost use in all land maintenance activities. Florida's rule requires state agencies to procure compost products when they are cost competitive. North Carolina's legislation says that all state agencies and local governments must procure compost when it is cost-competitive and a suitable substitute.

California's recycling legislation includes specific language for cities and counties on increasing markets for compost materials, including an evaluation of the feasibility of procurement preferences. It also states that the Department of General Services, along with other affected state agencies, shall promulgate regulations for the purchase of compost. The regulations are supposed to designate minimum operating and product quality standards (Goldstein, 1990).

Developing markets for recyclable materials was again a targeted policy in 1992 for many states. A trend began with market development beginning to meld into economic development. The connection between markets, the economy, and the key phrase "job creation" helped to push program ideas ahead.

Pennsylvania took the lead with the Recycling Incentive Development Account, a program implemented by the Markets Development Task Force. Five million dollars over five years will be diverted from the state Recycling Fund into the account and made

available as low interest loans to businesses that process recyclable materials or manufacture a product with recycled content (Steuteville, June, 1993).

Legislatures in seven states saw tax credits as a route to market development. Arkansas, Arizona, Pennsylvania, Kansas, New York, Virginia, and Iowa passed tax breaks or exemptions on equipment or materials used in manufacturing end products with post consumer recycled content. In addition to financial and tax incentives, five states made organizational moves to improve market conditions. Indiana, North Carolina, Ohio, and Arizona created market development task forces or advisory boards designed to bring together key players from non-profit organizations, government, and business (Steuteville, June, 1993).

Jobs/Economic Development

For the first time in 1993, *BioCycle* asked states if they had programs aimed at creating jobs and economic development in the recycling industry. Thirty-six states answered affirmatively. Many of the fifteen states that do not report having such a program nevertheless have tax credits for recycling equipment, or other initiatives that represent a partial step toward economic development (Steuteville, May, 1994).

The numbers clearly show that jobs and economic development are playing a growing role in recycling policy nationwide. New York was the pioneer when it created the Office of Recycling Market Development (ORMD) within the state Department of Economic Development in 1988. "In order to achieve the environmental and solid waste management benefits of recycling, you need some basic outcomes driven by business

development and the market-place," says Will Ferretti, the director of ORMD. The ORMD uses tools that are now common in state programs, including loans, grants, technical assistance and marketing data provided to companies that use recycled materials (Steuteville, May, 1994).

Action at the Federal Level

The Clinton Administration took an active role in recycling policy in 1993. In keeping with state priorities, the administration targeted most of its initiatives at markets and job creation in the recycling industry. One EPA program, "Jobs Through Recycling," targets economic development at the state level.

The EPA distributed grants to promote jobs in the recycling industry to thirteen states in 1994, at least two of which did not have recycling programs of any kind. A total of about $2 million will be used to establish Recycling Business Assistance Centers in four states. Nine states will receive grants of $74,000 to be awarded to hire Recycling Economic Development Advocates (REDAs) in state departments of commerce or economic development (Steuteville, May, 1994).

The federal government funded another important initiative aimed at markets. In the fall of 1993, a $1.2 million grant was awarded to the Clean Washington Center (CWC) in Washington State, and the National Recycling Coalition (NRC) in Washington, D.C. The Recycling Technology Assistance Program is paying for technology outreach through the CWC to 700 industrial firms to help them use more recycled feedstocks. The NRC will disseminate the information nationally. The program is intended to be a model for other states to follow (Steuteville, May, 1994).

The state of garbage in the United States is to reduce, recycle, reuse. The number of landfills is steadily decreasing and the number of recycling facilities is increasing. There are more curbside recycling programs and more composting facilities. States are setting waste reduction goals and implementing legislation to reduce the waste stream going to the landfills. One way to do this is to ban specific recyclable materials from entering the waste stream. One such material is yard waste. Certain states with yard waste bans within their solid waste reduction legislation will be evaluated for their effectiveness in the following case studies.

CHAPTER TWO

CASE STUDIES

METHODOLOGY OF THE RESEARCH

As previously discussed, an important part of waste reduction and recycling efforts is the marketability of recycled products, consumer education, and the financial assistance that is set up through the federal and state legislation. The effectiveness of these elements is important to the success of solid waste reduction.

Most State Solid Waste Management Acts declare their purpose to include the following:

- Protect the public health and welfare
- Prevent water and air pollution
- Prevent the spread of disease and the creation of a nuisance
- Conserve natural resources
- Enhance the beauty and quality of the environment

In order to judge a State Solid Waste Management Plan and evaluate its effectiveness, it must be determined what the important elements within the legislation are that allow the state to achieve its goals.

The first thing noted for each state in this research will be the agency or agencies which are administering the legislation. The duties of the department overseeing the Act will be summarized. Then the part within the legislation that bans yard waste will be stated.

The legislation of various states will be compared, and specific elements within the legislation will be examined to determine their effectiveness. The elements to be considered within the legislation include:

- Incentives for recycling, reuse, and composting such as market development
- Alternative uses for yard waste
- Recycling programs
- Education
- Fines
- Financial assistance
- Target goals and dates

All of these elements help promote the activities of recycling, reusing, and composting yard waste and are an integral part of the success of each states' management plan.

Incentives, for the production of recycled products such as marketability or tax breaks, are an important element. For people to change their actions and way of doing things, they need motivation. The primary motivation is money. There needs to be a market for yard waste and compost so that it can be a profitable business and people will be encouraged to become involved. Tax breaks to composting facilities or recycling businesses is another monetary incentive for involvement.

Alternative uses for the yard waste is very important. This is what provides the market for the products produced. Research is important to determine what products can be produced and what uses they might have. Alternative uses can consist of energy production, fuel production, and the many uses for compost. Research is found within the alternative

use element if the legislation provides for research for this propose or under the education element if the research is directly linked to education of the public. It is dependent on how it is written into the legislation.

Recycling programs should be a strong part of the legislation to provide public involvement in the recycling effort. Curbside pick-up programs can provide an avenue for people to save reusable materials and dispose of them easily. Composting programs whether home or public facility will provide people with a product that can be used for many things around the house.

Education of the public as to the reasons to recycle and reuse will help smooth the way once the ban takes hold so the public understands the reasons behind the actions. Education should start with grade school children to get the recycling pattern started early in life. Education should be implemented early and be in place before any bans are put into effect.

Fines are important so there is a strong message given to those who do not obey the legislation. There should be strict penalties for noncompliance with the recycling efforts and the fines should be enforceable. Fines can be a strong message to the importance of waste stream reduction.

Financial help to start the process will be necessary. Through federal and state grants money can be provided to help private businesses set up recycling and composting facilities. Some of the financial help can be through the fines invoked. Financial help to start recycling efforts is an important tool to the effectiveness of state solid waste management plans.

And lastly, goals and target dates are important to determine whether the progress of the actions taken is adequate to reduce solid waste in the landfills. It will take a few years after the legislation and yard waste bans are enacted before it can be proven if the goals set are realistic ones. If target goals are met then the legislation can be proven as effective to the reduction of the solid waste stream.

We have chosen eleven states with yard waste ban legislation. There are many different types of yard waste bans. Some are very specific and some are general. Some cover only certain kinds of yard waste, such as leaves only, and others are inclusive of all yard waste. These states were chosen because the bans were similar, and adequate information was found to conduct comparisons. The primary information was obtained through state statutes or annotated codes, senate and house bills which enacted the legislation, and the individual states' solid waste management report.

Each state will be listed individually with each element described in detail. The states will be presented in alphabetical order as follows; Florida, Georgia, Illinois, Iowa, Massachusetts, Missouri, New Hampshire, North Carolina, South Dakota, West Virginia, and Wisconsin. These states are primarily on the east coast and Great Lakes region. This is due to the lack of land available for landfills and the fact that the east coast states have had to deal with landfill closure problems sooner and more vigorously than other states. They have looked at recycling and reuse programs longer than states who might still have adequate land available for landfills.

After the states are listed and their legislation detailed, a comparison among the states will be made and the legislation will be

judged as effective or not from the presence or absence of the elements within the legislation. A chart will be provided to show the states and which of the elements are present. The chart will also show a grade for each element as to it's adequacy of coverage within the legislation.

INDIVIDUAL STATE CASE STUDIES

The states being evaluated all have similar yard waste ban legislation. The bans include all yard waste and do not target specific parts of the yard waste stream. The effective dates for the bans range from 1990 to 1996. Georgia's legislative ban is the newest one and has not taken effect. West Virginia's legislation took effect in 1993 but due to problems implementing elements of the legislation, the effective date for the ban has been delayed until 1996.

The description of the elements within the legislation will primarily be for all solid waste reduction for the state. Those programs with elements that are specifically intended for yard waste will be noted as such. They will primarily deal with composting and composting facilities.

Florida

The two references of Florida's Solid Waste legislation were Chapter 403 of the Florida Statutes entitled "Environmental Control--Part IV - Resource Recovery and Management" and the "1993-1994 Florida Solid Waste Management Report" prepared by the Bureau of Solid and Hazardous Waste. The information on Florida's Solid Waste

Management was obtained from the Florida Department of Environmental Protection.

The act is known and cited as the "Florida Air and Water Pollution Control Act." The purpose of Part IV is to, among other things, promote the reduction, recycling, reuse, or treatment of solid waste in lieu of disposal of such wastes. The responsible department is the Department of Environmental Regulation who's duties include the implementation and enforcement of the provisions of this act.

The act includes many parts with the following pertaining to this study: Compost standards and applications; state solid waste management program; prohibition and penalty; solid waste management trust fund; solid waste management grant program; revenue bonds; and applications demonstration center for resource recovery from solid organic materials. Each of these parts include the elements which will be examined in detail.

The ban on yard waste is stated as follows - No person who knows or who should know of the nature of such solid waste shall dispose of such solid waste in landfills: Yard trash, after January 1, 1992. Yard trash that is source separated from solid waste may be accepted at a solid waste disposal area where the area provides and maintains separate yard trash composting facilities. Prior to the effective date specified, the department shall identify and assist in developing alternative disposal, processing, or recycling options for the yard waste.

Incentives

One of the purposes of the act is to encourage counties and municipalities to utilize all means reasonably available to promote

economical recovery of material and energy resources including contracting with persons to provide or operate resource recovery services or facilities. The department is to provide an evaluation of the markets for recycled materials and the success of state, local, and private industry efforts to enhance the markets for such materials. Local governments are encouraged to separate and recycle yard trash into compost available for agricultural and other acceptable uses.

To define potential benefits of compost, several research and demonstration projects were conducted throughout Florida by the University of Florida's Institute of Food and Agricultural Sciences. A Recycling Markets Advisory Committee was established based on concerns about having adequate markets for the ever increasing supply of recovered materials in the state.

A fee is assessed in order to assist in achieving the municipal solid waste reduction goal and the recycling provisions. A county or a municipality that operates a solid waste management facility is authorized to charge a fee based on the amount, characteristics, and form of recyclable materials present in the solid waste that is brought into the facility.

Alternative Uses

One of the most substantial alternatives for yard waste is composting. Florida has provisions within the legislation for compost standards and applications. Instead of listing these for each of the states within this study and since they are all very similar, in Appendix B is a model of state compost standards which was provided by the Compost Council.

Florida has provided for an "Applications Demonstration Center for Resource Recovery from Solid Organic Materials" and there is a provision for conducting workshops to demonstrate applicable technologies which include the production of methane gas, compost, and other useful products. Yard trash will be used in innovative programs including programs that produce alternative clean-burning fuels such as ethanol or that provide for the conversion of yard trash to clean-burning fuel.

Recycling Programs

The solid waste management programs include assistance with the development of solid waste reduction and recycling programs. Each county shall initiate a recyclable materials recycling program.

Education

A public education and promotion program is to be conducted to inform residents of the opportunity to recycle, to encourage source separation, and to promote the benefits of reducing, reusing, recycling, and composting material. The public education program shall be implemented through public workshops and through the use of brochures, reports, public service announcements, and other material.

Fines

No fines were found within the legislation.

Financial Assistance

A Solid Waste Management Trust Fund is established to provide technical assistance to local governments, perform regulatory and

enforcement functions, and implement solid waste education programs. Grants and awards will be provided for local governments. Funding will be provided for research, demonstration, and training by state universities, community colleges, and independent nonprofit colleges and universities.

Target Goals

The goal is to reduce solid waste deposited at least 30 percent by the end of 1994. No more than one-half of the goal may be met with yard trash, white goods, construction debris, and tires.

Georgia

The data collected for the state of Georgia is from the 1981 Georgia Code (§ 12-8-20, enacted by Ga. L. 1990, p. 412, § 1). The act is known as the "Georgia Comprehensive Solid Waste Management Act whose legislative intent is to, among other things, educate and encourage the reduction of solid waste through reuse, composting, and recycling. The State of Georgia will also promote markets for and engage in the purchase of goods made from recovered materials and goods which are recyclable.

The director of the Environmental Protection Division of the Department of Natural Resources shall be the official charged with primary responsibility for the solid waste management program. The Board of Natural Resources of the State of Georgia shall adopt, promulgate, modify, amend, and repeal rules and regulations to

implement and enforce the provisions of the act and take all necessary steps to ensure the effective enforcement of the act.

Effective July 1, 1990, each city, county, or solid waste management authority shall have the right to impose certain restrictions on yard trimmings which are generated. These restrictions may include: a requirement that yard trimmings not be placed in or mixed with municipal solid waste; a ban on the disposal of yard trimmings at municipal solid waste disposal facilities; or a requirement that yard trimmings be sorted and stored for collection in such a manner as to facilitate collection, composting, or other handling.

Incentives

A Recycling Market Development Council is created to determine what actions are needed to facilitate the development and expansion of markets for recovered materials.

Alternate uses

The state solid waste management plan includes provisions for composting activities and facilities.

Recycling Programs

The Georgia Building Authority is authorized to establish and coordinate a state-wide recycling program for state agencies and to arrange for a collection program for recovered materials generated as a result of the agencies operation.

Education

The state solid waste management plan provides for a description of the respective roles of agencies in the implementation of a state-wide public information education program on solid waste management which emphasizes grass roots participation of all age levels.

Fines

In rendering a decision imposing civil penalties, the administrative law judge shall consider all factors including the amount of civil penalty necessary to ensure immediate and continued compliance and the character and degree of impact of the violation or failure to comply.

Financial Assistance

The state is authorized to make grants available to any county, municipality, or any combination to assist in construction of handling facilities or clean up of facilities.

Target Goals

It is the intent that every effort be taken to reduce on a state-wide and per capita basis the amount of municipal solid waste being received at disposal facilities during fiscal year 1992 by 25 percent by July 1, 1996.

Illinois

The information on the Illinois legislation was obtained from the Illinois Code Annotated (P.A. 85-1198, § 1, eff. January 1, 1989) and titled as the "Solid Waste Planning and Recycling Act." The purpose of this Act is to provide incentives for decreased generation of municipal waste, to require certain counties to develop comprehensive waste management plans that place substantial emphasis on recycling and other alternatives to landfills, to encourage municipal recycling and source reduction, and to promote composting of yard waste.

The lead agency for implementation of this Act is the Illinois Environmental Protection Agency. The agency shall review each county waste management plan to ensure consistency with the requirements of this Act. Each county shall have their own advisory committee to review the plan, make suggestions, and propose changes it believes appropriate.

No sanitary landfill may accept for final disposal at any time yard waste except those separated may be accepted at those facilities providing and maintaining composting facilities. This ban is to be effective as of July, 1990.

Incentives

A task force is established for developing markets for recyclable materials. The task force shall study the existence of markets for recyclable materials, and the feasibility of various methods of encouraging the development of such markets. The task force shall evaluate financial incentives for market development programs and

investigate and explore the potential for developing international markets.

Alternate Uses

It is the purpose of the Act to reduce reliance on land disposal of solid waste, encourage and promote alternative uses for the solid wastes, and assist local governments with solid waste planning and management.

Recycling Programs

Each county waste management plan adopted shall include a recycling program. It will provide for the construction and operation of one or more recycling centers.

Education

The recycling program shall include public education and notification programs to foster understanding of and encourage compliance with the recycling programs. A central clearinghouse of information regarding the implementation of the Act shall be set up. The Department of Energy and Natural Resources shall develop and conduct a public education and awareness campaign to encourage the public to look for and buy products in containers which are recyclable or made of recycled materials.

Fines

Any person that violates any provision of the Act shall be liable for a civil penalty not to exceed $5,000 for such violation. The Attorney General may institute a civil action against any violator of this Act.

Financial Assistance

The Department shall make grants from the Solid Waste Management Fund to municipalities with approved pilot recycling projects. Such grants shall be limited to 50 percent of the project cost, not to exceed a total of $50,000 per project. The Department shall also provide loans or recycling and composting grants to businesses and not-for-profit organizations for the purposes of increasing the quantity of materials recycled or composted. A Recycling Economic Development Program is set up to develop enterprises that use secondary materials that are collected in municipal and business recycling programs for the manufacture of recycled-content products.

Target Goals

The recycling program is designed to recycle, by the end of the third and fifth years of the program, 15 percent and 25 percent respectively, of the municipal solid waste generated in the county. The recycling provisions of the waste reduction plan shall be designed to achieve, by January 1, 2000, at least a 40 percent reduction.

Iowa

The information obtained for the state of Iowa is from the Code Annotated (Chapter 455 D) entitled "Waste Volume Reduction and Recycling". The purpose of this Act is to establish a waste volume reduction and recycling network, prohibit the disposal of certain products at sanitary landfills, promote the use of certain recyclable products and certain recycling or reprocessing equipment, establish fees and taxes, provide penalties, provide an effective date, and provide for other properly related matters.

The department which will oversee this Act is the Department of Natural Resources under the direction of the Iowa Environmental Protection Commission. The purpose of the Act is to encourage the development of waste volume reduction programs and education at the local government level through incentives, technical assistance, grants, and other practical matters.

Beginning January 1, 1991, land disposal of yard waste is prohibited. Yard waste which has been separated at its source from other solid waste may be accepted by a sanitary landfill for the purposes of soil conditioning or composting. The department shall assist local communities in the development of collection systems for yard waste generated from residences and shall assist in the establishment of local composting facilities.

Incentives

The commission shall recommend deposits, rebates, and waste abatement fees when necessary to encourage waste reduction and the recycling and recovery of useful components of that waste stream element.

Alternative Uses

It is the policy of the state to support and encourage the development of new uses and markets for recycled goods, placing emphasis on the development of businesses relating to waste reduction and recycling.

Recycling Program

The comprehensive plan shall provide details of a local recycling program which shall contain a methodology for meeting the state volume reduction goal.

Education

There is a provision for education concerning waste volume reduction at the elementary through high school levels and through community organizations that will enhance the success of local programs requiring public involvement.

Fines

No mention of fines was found in the legislation.

Financial Assistance

A waste volume reduction and recycling fund is created within the state treasury. The department shall award grants based upon the solid waste management hierarchy. It will be provided as financial assistance to public and private entities to develop and implement waste reduction programs, enhance markets for recyclable products, and establish recycling centers.

Target Goals

The goal of the state is to reduce the amount of materials in the waste stream, existing as of July 1,1988, 25 percent by July 1, 1994, and by 50 percent by July 1, 2000.

Massachusetts

The information obtained for the state of Massachusetts is from the Code of Massachusetts Regulations (310 CMR 19) entitled "Solid Waste Management." The authority of this Act is granted by St. 1987, c. 584, M.G.L. c. 21A, §§ 2 and 8 and c. 111, § 150A. The Commissioner of the Department of Environmental Protection is responsible for the administration of this act. The part of the Solid Waste Management Plan entitled "Solid Waste Disposal" is found in the code under the Department of Highways 16 § 18.

The purpose of the Act is to protect public health, safety and the environment by comprehensively regulating the storage, transfer, processing, treatment, disposal, use and reuse of solid waste in

Massachusetts. The department may restrict or prohibit the disposal of certain components of the solid waste stream when it is determined that it will result in the extension of the useful life or capacity of a facility. As of December 31, 1991 leaves are banned from disposal or incineration. As of December 31, 1992 other yard waste is banned from disposal or incineration.

Incentives

No marketing incentives were found in the legislation.

Alternative Uses

There is a section of the Act which deals with beneficial uses of solid wastes. The department shall make a positive determination of beneficial use if the applicant demonstrates certain criteria. No specific uses are listed except for composting of leaves and other organic matter.

Recycling Program

The department, in consultation with the Department of Food and Agriculture, shall establish a program to provide for recycling through composting of leaves and other organic matter. No permit for a landfill or combustion facility shall be issued unless the facility provides for recycling or composting. The department is authorized to implement regional yard waste and leaf composting projects. The Department of Food and Agriculture shall establish an agricultural composting program.

Education

There are no provisions in the legislation for education.

Fines

Any person who violates any provision of this chapter shall be punished by a fine of not more than $25,000 or by imprisonment for not more than two years for each such violation, or shall be subject to a civil penalty not to exceed $25,000 for each such violation.

Financial Assistance

Financial assistance is provided only to those public bodies for clean-up of contamination of water supplies caused by landfills or closure of landfill facilities.

Target Goals

No specific target dates or reduction amount are set.

Missouri

The information obtained for the state of Missouri is from Senate Bill No. 530, the Solid Waste Management Act (Act 641 of 1978), and the Code of State Regulations under Conservation, Resources and Development entitled "Solid Waste Disposal". The purpose of the act includes giving full consideration to the purchase of products made from materials recovered from solid waste. The agency responsible for this Act

is the Environmental Improvement and Energy Resources Authority of the Department of Natural Resources.

Some of the duties of the department are to propose a plan to divide the state into solid waste management regions and establish a solid waste management council for each solid waste management district. The director of the department shall establish a "Source Reduction Advisory Board".

The ban of yard waste within the legislation is stated as follows: After January 1, 1992, yard waste shall not be disposed of in a solid waste disposal area.

Incentives

Some of the department's duties include promoting resource recovery in the state in ways which are economically feasible. They will identify markets for recovered materials and for energy which can be produced from solid waste. They will also initiate activities with appropriate state and local entities to develop markets for recovered materials.

Alternative Uses

The legislation states that a person who engages in clearance, trimming or removal of trees, brush or other vegetation may use wood wastes from such activities for beneficial purposes including, but not limited to, firewood, ground cover, erosion control, mulch, compost, or cover for wildlife.

Recycling Programs

The department has a duty to initiate recycling programs within state government.

Education

The department will initiate, conduct and support research, demonstration projects, and investigations with applicable federal programs. They will provide a clearinghouse of consumer information regarding the need to support resource recovery, utilize and develop new resource recovery programs around existing enterprises, request and purchase recycled products, participate in resource conservation activities and other relevant issues. The solid waste management plan includes establishing an education program to inform the public about responsible waste management practices.

Fines

A person commits the offense of criminal disposition of solid waste in the first degree if he purposely or knowingly disposes of or causes the disposal of more than 500 pounds or 100 cubic feet of commercial or residential solid waste. Criminal disposition of solid waste in the first degree is a class A misdemeanor. The person is subject to a fine not to exceed $20,000. Any person who pleads guilty or is convicted of criminal disposition of solid waste a second time shall be guilty of a class D felony. The fine shall be set at least three times the economic gain obtained by the person and may exceed the maximum established. Other violations include criminal deposition of solid waste in the second

degree which is a class C misdemeanor and if convicted a second time it is a class D felony.

Financial Assistance

The department shall establish criteria for awarding state funded solid waste management planning grants. For fiscal years 1992-1997, one-million dollars from the solid waste management fund shall be made available to the department to fund activities that promote the development of markets for recovered materials. Ten percent of the money shall be allocated to elimination of illegal solid waste disposal. Fifteen percent is to cover administrative costs. Up to 25 percent is to be used to provide incentives to operators of solid waste facilities to remove recyclable or reusable items from solid waste. At least 25 percent of the money shall be allocated to cities, counties, or districts through grants or loans.

Target Goals

The solid waste management plan is designed to achieve a reduction of 40 percent in solid waste disposed, by weight, by January 1, 1998.

New Hampshire

The information on New Hampshire's solid waste legislation was obtained from the New Hampshire Revised Statutes Annotated (Public Health Chapter 149-M) entitled "Solid Waste Management. The general

court that put this legislation together supports integrated solid waste disposal solutions which are environmentally safe and economically sound. The three preferred methods of management are source reduction, recycling and reuse, and composting.

The agency responsible for solid waste management is the Department of Environmental Services, Division of Waste Management. Its duties include establishing management policies and goals and encouraging source reduction, recycling and reuse, and composting.

The state yard waste ban is stated as follows: Beginning July 1, 1993, no leaf or yard waste shall be disposed in a solid waste landfill or incinerator including any waste-to-energy facility.

Incentives

One of the responsibilities of the division of waste management is to contract for the coordination of the recovery and marketing of recyclable materials with a nonprofit New Hampshire corporation whose primary function is the recycling of solid waste materials for municipalities, solid waste districts, and state agencies. They will also identify and establish markets within or without the state for the sale of recycled or reclaimed solid waste materials from the solid waste disposal facility within the state, including the purchase and resale of such products by the division of waste management or other state agencies.

Alternative Uses

Composting is the only alternative listed for the use of yard waste.

Recycling Programs

Recycling programs are listed as proposed strategies within the private sector and municipal solid waste district initiatives but no specific programs are addressed.

Education

Public education is listed as a proposed strategy for achieving the solid waste reduction goal but no specific ideas are addressed.

Fines

The commissioner may impose an administrative fine not to exceed $2,000 for each offense upon any person who violates any provision of this chapter.

Financial Assistance

Grants are only available and assistance given for closure of unlined solid waste facilities. There are no provisions for assistance in recycling or composting programs.

Target Goals

The general court declares that the goal of the state, for the period 1990-2000, is to achieve a 40 percent minimum weight reduction in the solid waste stream on a per capita basis.

North Carolina

The information obtained for the state of North Carolina is from the North Carolina Code Annotated (§130A-290. Public Health, Article 9) titled "Solid Waste Management", and S.B. 111 (1989 Session Laws, Chapter 784) "An Act to Improve the Management of Solid Waste." The Act is under the responsibility of the North Carolina Department of Environmental Protection which maintains a Division of Solid Waste Management. The Division of Solid Waste Management will, among other things, promote the greatest possible recycling and recovery of resources.

It is the policy of the state to promote methods of solid waste management that are alternatives to disposal in landfills and to assist units of local government with solid waste management. There is a hierarchy of methods of managing solid waste in descending order of preference:

- Waste reduction at the source
- Recycling and reuse
- Composting
- Incineration with energy production
- Incineration with volume reduction
- Disposal in landfills

No person shall knowingly dispose of yard trash after January 1, 1993. Yard trash that is source separated from solid waste may be accepted at a solid waste disposal area where the area provides and maintains separate yard trash composting facilities.

Incentives

In order to assist in achieving the municipal solid waste reduction goal and recycling provisions, a county or municipality that operates a solid waste facility may charge disposal fees based on the amount, characteristics, and form of recyclable materials present in the solid waste that is brought into the facility.

Alternate Uses

Research, training, and service activities related to solid waste recycling and reuse will be conducted at the University of North Carolina. Composting is one of the uses for the yard waste.

Recycling program

Each designated local government shall initiate a recyclable materials program by July 1, 1991. In order to orient students and their families to the recycling of waste and to encourage the participation of schools, communities, and families in recycling programs, the school board of each school district in the state shall make available an awareness program in the recycling of solid wastes. This aspect of the program will also fit under the education element.

Education

The department shall provide for the education of the general public and the training of the solid waste management professionals to reduce the production of solid waste, to ensure proper processing of solid waste, and to encourage recycling and solid waste reduction. The educational program shall be in cooperation with the Department of

Public Instruction to inform the public of the need for and benefits of recycling solid waste.

Fines

A person who violates this Act shall be guilty of a misdemeanor and upon conviction shall be punished.

Financial Assistance

The department shall manage a program of grants for programs for recycling and waste management. The Solid Waste Trust Fund is created to fund activities to promote waste reduction and recycling and research on the solid waste stream.

Target Goals

It is the goal of this state to reduce the municipal solid waste stream 25 percent by June 30, 1993, and by 40 percent by June 30, 2001.

South Dakota

The information obtained for the state of South Dakota is from the South Dakota Code Annotated (§§ 34A-6) and South Dakota H.B. 1001 of 1992 which amended 34A-6. The department overseeing the act is the South Dakota Department of Environment and Natural Resources. This act is to establish programs and regulations that reduce the amount of solid waste disposed in landfills in the state.

In achieving the waste reduction goals, every municipality shall implement the following landfill waste reduction targets: beginning on January 1, 1995, all yard waste shall be eliminated from landfilled wastes.

Incentives

The elements of the programs include the promotion of efforts to increase the purchase and use of recycled products by government, business, and the public. Efforts will also be made to develop markets for recyclable materials.

Alternative Uses

There will be promotion of research, manufacturing processes and product development that provide for source reduction through the use of alternative materials and through decreased material input and resource consumption.

Recycling Programs

The department shall establish a statewide waste reduction and recycling program to promote the waste management policy. The bureau of administration shall establish a program to reduce the amount of solid waste generated by state agencies and to promote the separation and recovery of recyclable materials and the procurement of recycled materials and recovered materials by state agencies to include compost.

Education

Public education programs will be implemented to promote public awareness of waste volume reduction and the use of recyclable materials. The department shall collect, prepare and disseminate information and conduct educational and training programs that assist in the implementation of the Act and other related solid waste management programs. All public and nonpublic schools shall provide instruction in the subjects of recycling, source and volume reduction of solid waste, and related environmental issues associated with solid waste.

Fines

The only fines are in association with waste tires.

Financial Assistance

There is a solid waste management fee of one dollar per ton for all municipal solid waste disposal facilities. There is a fee of $25 dollars per tire. All fees are deposited in the water and environment fund and shall be used for source reduction, recycling, and waste management program establishment.

Target Goals

The goal of the state is to reduce the amount of materials in the waste stream, existing as of July 1, 1992, 25 percent by July 1, 1996, and 50 percent by July 1, 2001, through the practice of solid waste source reduction, recycling, reuse, and composting.

West Virginia

The information for West Virginia's solid waste legislation was obtained from Charles F. Jordan of the W.V. Solid Waste Management Board. The information includes: Senate bill No.18 which passed in 1991; Senate bill No. 400 which passed in 1993; Senate bill No. 1021 which passed in 1994; the West Virginia State Solid Waste Management Plan; West Virginia Code Annotated (Vol. 8 § 20-11-8); and "Program for Handling Yard Waste in West Virginia" prepared by The Solid Waste Management Board.

The reason for so many senate bills is that the date for the implementation of the yard waste ban from landfills has changed three times. The original ban is stated as: effective June 1, 1993, it shall be unlawful to deposit yard waste, including grass clippings and leaves in a solid waste facility in West Virginia. The prohibition does not apply to a facility designed specifically to compost such yard waste, or to otherwise recycle or reuse such items. S.B. 400 extended the deadline for prohibition on the disposal of yard waste to be effective June 1, 1994. It also introduced a comprehensive program to provide for the proper handling of yard waste and rules to enforce the program. Senate bill 1021 extended the yard waste prohibition until January 1, 1996.

Incentives

The program for handling yard waste includes determining uses for compost and includes a table of the compost users which includes commercial, residential, and public agencies. It also deals with the issue

of transportation of the compost, the demand for compost, and the distribution and marketing options for compost.

Alternative Uses

The major use for yard waste is compost and the state deals with composting facilities and rules.

Recycling Programs

The state recycling plan includes establishing county recycling programs.

Education

A comprehensive public information and education program covers the importance and benefits of recycling, as well as the specific features and requirements of the recycling program. There is an operating training certification program for training the operators of compost facilities. The program for handling yard waste discusses the success of a composting program and public education. It talks of using news releases and the news media to inform people of a project or program.

Fines

No fines are mentioned.

Financial Assistance

There is a closure fund set up to assist those facilities that are closing down.

Target Goals

No target goals are mentioned.

Wisconsin

The information obtained for the Wisconsin solid Waste legislation was the Wisconsin Statutes Annotated, (Chapter 159) entitled "Solid Waste". The department which oversees the solid waste legislation is the Wisconsin Department of Natural Resources. Their duties include promulgating the rules necessary to implement this chapter, development of markets for materials derived from post consumer waste, and coordinate research, technical assistance and education programs.

After December 31, 1990, no person may discharge, deposit, dump, or place in a solid waste facility yard waste that is in a bag unless the bag is constructed of a material that decomposes within a reasonable time after exposure to weather elements and is labeled as being so constructed. Beginning on January 3, 1993, no person may dispose of yard waste in a solid waste disposal facility, except in a land spreading facility, or burn yard waste with energy recovery in a solid waste facility.

Incentives

One of the duties of the department is to strengthen or expand an existing market for a material for which demand is insufficient to utilize the projected supply or for which the price is low relative to the costs of separating the material, processing, and transporting to market. Encouragement is promoted for research, development, and innovation in the design of facilities for reuse, recycling, and composting. This will

help lower operating costs and provide incentives for the use of these systems and operations and their products.

Alternative Uses

Burning of solid waste to produce energy is a substitute for the burning of nonrenewable fuels, such as coal. Energy production is in the public interest and should be encouraged.

Recycling Programs

Recycling programs must meet specific criteria which include providing adequate separate containers for the program, providing for the collection of recyclable materials separated from solid waste by the people, and delivering of the recyclable materials to a recycling center.

Education

The department will coordinate research, technical assistance and educational programs with related activities of the University of Wisconsin. A public education component of the act is to inform residents of the region of the reasons to recycle and opportunities to recycle. The department shall collect, prepare, and disseminate information and conduct educational training programs designed in the implementation of solid waste management programs. The department shall conduct activities to make the public aware of the need to cease disposing of yard waste in solid waste disposal facilities.

Fines

Any person who violates the act may be required to forfeit $50 for the first violation, $200 for the second violation and not more than $2,000 for a third violation.

Financial Assistance

Financial assistance is available for responsible units operating a solid waste management program during the year from which an application is submitted.

Target Goals

No goals were mentioned in the legislation.

CHAPTER THREE

DATA SUMMARY, EVALUATION, AND CONCLUSION

DATA SUMMARY

The data was obtained from eleven states and was grouped into the categories of: Incentives, Alternative Uses, Recycling Programs, Education, Fines, Financial Assistance, and Target Goals. The results of the data are listed below in the table. They have been given one of three marks: a **+** for good findings; a **^** for adequate findings; and a **o** for insufficient findings.

State	Incent.	Altern. Uses	Recycle Program	Educa.	Fines	Finan. Assist.	Target Goals
FL.	+	+	^	+	^	+	+
GE.	^	^	^	^	+	^	+
IL.	+	^	^	+	+	+	+
IO.	^	^	^	+	o	+	+
MS.	o	^	+	o	+	^	o
MO.	+	+	o	+	+	+	+
NH.	+	^	^	^	+	^	+
NC.	^	^	+	+	^	^	+
SD.	^	^	+	+	o	+	+
WV.	^	^	^	+	o	o	o
WI.	+	+	^	+	+	^	o

The results of each element will now be analyzed, explaining why the elements within the states were graded the way they were. If the element was given a **+**, there was very good coverage of that element within the state legislation. If the element was graded with a **^**, then the element was mentioned within the state legislation but was not addressed in detail as compared to other states. If the grade was a **o**, then there was no mention in the legislation of the element. This does not mean that the state does not address this element but that it was not included in the information obtained.

One of the problems encountered in researching state legislation is that the entire Solid Waste Management Act may be in different places of the Code Annotated or the Statutes under different departments. It is possible that I was unable to find the entire act and therefore unable to judge the act in it's entirety with all elements being addressed. This is why there may be an **o** in the space for the element but that state's Solid Waste Management Act may actually cover that element.

Incentives

Florida, Illinois, Missouri, New Hampshire, and Wisconsin listed many incentives for marketability of recyclable products and even research into the markets. As long as there is a market for the products then people will be encouraged to recycle and compost. With an increased market, the costs for producing the recycled products should decline. Economic benefits to recycling and composting are the number one thing which will prove a program successful. Another type of economic incentive is a tax break. This element should be in place before the ban on yard waste becomes effective.

Alternative Uses

Finding alternative uses for the solid waste is very important in keeping it out of landfills. Florida, Missouri, and Wisconsin were the states which addressed this element the most effective. Florida and Wisconsin not only have regulations for composting facilities but suggest that it could be burned for energy production. Missouri mentions using yard waste products for erosion control and cover for wildlife among others. Finding alternative uses for the waste is essential in developing markets and having a successful program.

Recycling Programs

Massachusetts, North Carolina, and South Dakota have the most in depth look at recycling programs. Massachusetts has an elaborate composting program with many of the solid waste facilities having composting facilities on the site. North Carolina combines educating children with their recycling programs. South Dakota's recycling programs involve state agencies. These aspects of recycling programs are important. They get many people involved in the process of recycling and the programs overall.

Education

Education is dealt with strongly by Florida, Illinois, Iowa, Missouri, North Carolina, South Dakota, West Virginia, and Wisconsin. Education is also one of the most important elements because people need to know why they are recycling and feel that what they are doing is important. The education needs to start very early in life and so elementary

education is great. If young people have learned early to recycle then they will continue to do this as they get older. It should be a habit.

The other aspect of education that is important is research into products and uses for products obtained from solid waste. This also is involved in the elements of marketability and alternative uses. If states are addressing these issues in their legislation then they are ahead of the other states.

Fines

This element is dealt with by Georgia, Illinois, Massachusetts, Missouri, New Hampshire, and Wisconsin. The one state that dealt with this the most in-depth was Missouri. They have many fines listed for many different activities. Massachusetts had the most stringent fines at $25,000. The other states' fines ranged anywhere from $50 to $2,000 with two states issuing fines of $20,000. Fines are a message to people as to the importance of the legislation and the strength of the commitment the state has taken to enforce the legislation. One aspect that is not dealt with in the legislation is the enforcement of the fines. If the fines are not enforced then they have no strength.

Financial Assistance

There were five states with very descriptive financial assistance in the legislation. They were Florida, Illinois, Iowa, Missouri, and South Dakota. These are available in the forms of grants and loans for things such as recycling programs, recycling business incentives, or recycling product manufacturing. These things will help promote recycling due to increased marketability and availability. Financial assistance for private

and public programs is very important to the success of a state achieving it's waste reduction goals.

Target Goals

Target goals were mentioned in all but three of the states' legislation. These goals are important because they will tell the state if the waste reduction programs are working. Since the legislation is new, it will be years before many of these states can tell if the legislation is effective or if the goals set were unrealistic.

EVALUATION

Of the eleven states evaluated, no one state stands above the others with outstanding solid waste legislation that deals with the outcome of banning yard waste from landfills. The most important things to look at are marketability of products, education, and financial assistance. The states with good ratings in these three categories are Florida, Illinois, and Missouri. The state with the most +'s is Missouri with +'s in six out of seven elements.

Problems and Areas to Address

One of the problems facing states is how to implement the yard waste ban and when to do so. West Virginia has learned through trial and error that there is a process that must be followed and some parts of the plan must be started before others. In order to implement a yard

waste ban, the public must first be educated as to what is happening and why. The educational aspects of the plan and the recycling programs must be in place before the effective date of the yard waste ban. People must be aware and educated to a new way of doing things. They need to know what to do with the yard waste once the ban is effective. This is not a process that can occur overnight.

When looking at yard waste, the one area to address is composting. Home composting education, public and private composting facilities, and research into uses for compost are very important. The states that dealt with these issues well were Florida, Missouri, North Carolina, and West Virginia. This is an area that will be very important to the future of solid waste reduction in terms of yard waste. There are still many things to be done in this area especially in home composting education and in educating homeowners not to collect and bag grass clippings.

If more people were aware of the benefits of not collecting grass clippings and leaves in the fall, there would be a great reduction in the amount of yard waste almost overnight. One help in this area is the lawn invention of the mulching mower. Another is the many "Don't Bag It!" programs throughout the nation.

Research being done with yard waste is in many areas. One area is the agricultural benefits of land application of uncomposted yard waste as a soil amendment. The problem to be addressed here is how to get the yard waste from the urban area to the farm. Other research is in the use of compost as a soil amendment in nurseries for growing plants. And still another very new field of research is that of using yard waste compost for erosion control. This area of study could promote a huge market for the use of yard waste and compost.

Recommendations for Elements in a Model Act

After evaluating each state's legislative provisions, recommendations can be made on what would be contained in a model act. These are based on the best of the existing state laws evaluated. Each of the elements identified earlier will be addressed.

Incentives

One of the purposes of state legislation is to encourage counties and municipalities to utilize all means reasonably available to promote economic recovery of material and energy resources including contracting with persons to provide or operate resource recovery services or facilities. A state agency should provide an evaluation of the markets for recycled materials and the success of state, local, and private industry efforts to enhance the markets for such materials. Local governments should be encouraged to separate and recycle yard trash into compost available for agricultural and other acceptable uses.

To define potential benefits of compost, several research and demonstration projects should be conducted throughout the state. A Recycling Markets Advisory Committee should be established based on concerns about having adequate markets for the ever increasing supply of recovered materials in the state. There should be adequate incentives to the producers of compost so that it can be a profitable endeavor.

A fee needs to be assessed in order to assist in achieving the municipal solid waste reduction goal and the recycling provisions. A county or a municipality that operates a solid waste management facility should be authorized to charge a fee based on the amount,

characteristics, and form of recyclable materials present in the solid waste that is brought into the facility.

Alternative Uses

The legislation should state that a person who engages in clearance, trimming or removal of trees, brush or other vegetation will use wood wastes from such activities for beneficial purposes including, but not limited to, firewood, ground cover, erosion control, mulch, compost, or cover for wildlife.

One of the most substantial alternatives for yard waste is composting. Provisions are needed within the legislation for compost standards and applications. Appendix B is a model of state compost standards that was provided by the Compost Council.

Yard waste reuse and compost facilities should be addressed at different scales. There will be different facility needs for large cities as compared to rural or county needs. Research needs to be done into what size of compost facility can accommodate what size of population.

States need an "Applications Demonstration Center for Resource Recovery from Solid Organic Materials" and provisions for conducting workshops to demonstrate applicable technologies which include the production of methane gas, compost, and other useful products. Innovative programs need to be developed that produce alternative clean-burning fuels such as ethanol or that provide for the conversion of yard trash to clean-burning fuel.

Recycling Programs

State agencies should establish a program to provide for recycling through composting of leaves and other organic matter. No permit for a landfill or combustion facility should be issued unless the facility provides for recycling or composting. The agency should be authorized to implement regional yard waste and leaf composting projects. The agency should establish an agricultural composting program.

Education

The state agency should initiate, conduct and support research, demonstration projects, and investigations with applicable federal programs. A clearinghouse should provide consumer information regarding the need to support resource recovery, to utilize and develop new resource recovery programs around existing enterprises, to request and purchase recycled products, to participate in resource conservation activities and other relevant issues.

The solid waste management plan should include establishing an education program to inform the public about responsible waste management practices. Public education programs should be implemented to promote public awareness of waste volume reduction and the use of recyclable materials. The state agency should collect, prepare and disseminate information and conduct educational and training programs that assist in the implementation of the act and other related solid waste management programs. All public and nonpublic schools should provide instruction in the subjects of recycling, source and volume reduction of solid waste, and related environmental issues associated with solid waste.

Fines

Fines are needed for persons who commit the offense of criminal disposition of solid waste in the first degree if they purposely or knowingly dispose of or cause the disposal of more than five hundred pounds or one hundred cubic feet of commercial or residential solid waste. Criminal disposition of solid waste in the first degree should be a class A misdemeanor. The person should be subject to a fine not to exceed $20,000. Any person who pleads guilty or is convicted of criminal disposition of solid waste a second time should be guilty of a class D felony. The fine should be set at least three times the economic gain obtained by the person and may exceed the maximum established. Other violations should include criminal deposition of solid waste in the second degree which should be a class C misdemeanor and if convicted a second time it should be a class D felony.

The fines should be enforced by the agency through encouraged public involvement in reporting violations. All reported violations from the public should be kept confidential. All public owned landfill personnel should be required to report any attempted disposal of a banned material at the landfill.

Financial Assistance

The state agency should establish criteria for awarding state funded solid waste management planning grants. For the next five years, one-million dollars from the solid waste management fund should be made available to the department to fund activities that promote the development of markets for recovered materials. Ten percent of the money should be allocated to eliminate illegal solid waste disposal.

Fifteen percent should cover administrative costs. Up to 25 percent should be used to provide incentives to operators of solid waste facilities to remove recyclable or reusable items from solid waste. At least 25 percent of the money should be allocated to cities, counties, or districts through grants or loans.

Target Goals

The recycling program should be designed to recycle, by the end of the third and fifth years of the program, respectively 15 percent and 25 percent of the municipal solid waste generated in each county. The recycling provisions of the waste reduction plan should be designed to achieve, by January 1, 2000, at least a 40 percent reduction. The level of solid waste reduction should be maintained indefinitely.

CONCLUSION

This research looked at a new trend in state legislation which began about five years ago. With stricter controls and regulations on landfills set by the EPA through RCRA, there is a urgent need for many states to reduce the amount of solid waste entering landfills. One of the avenues being explored by the states in their solid waste management plans is the banning of yard waste from entering the landfill facilities.

There are 27 states including the District of Columbia with legislative bans of yard waste from landfills now on the books although some have not taken effect yet. This research looked at the legislation of eleven states with yard waste bans. There were specific elements that

were thought to be important to the effectiveness of the legislation. These elements were: incentives to recycle and reuse; alternative uses for the yard waste; recycling programs; education of the public; fines ; financial assistance; and target goals for waste reduction.

The research has shown that no one state stands above the others in solid waste reduction legislation. There are strong areas as well as weak. The most important elements evaluated were incentives, education, and financial assistance. There are aspects of the legislation in each of the states that could be combined to formulate complete yard waste ban legislation. States who are looking to formulate or update their solid waste legislation should look at recommendations suggested for a model act. Many states could learn from the trials and errors of others.

There are many things that are yet to be evaluated when it comes to yard waste reduction. One use for yard waste being researched is agricultural land application. Agricultural land application could use a very large percentage of yard waste. Yard waste and compost can also be used as a soil stabilizer providing organic matter and perhaps reducing the amount of topsoil and fertilizer needed. It could be used for urban construction projects to reduce erosion.

As an example of how much compost could be used, one inch of compost spread over an acre represents approximately 65 tons at a 40 percent moisture content (compost typically contains a 40 to 60 percent moisture level). For a five acre landscaping project, that would represent 325 tons of compost (Kashmanian, 1990).

One aspect that needs to be addressed is the transportation needs for transferring the yard waste from urban areas to rural areas and how

to integrate the urban composting facilities with the state agricultural agencies who would land apply it. There needs to be a link between the urban areas that produce the greatest amount of the yard waste and the agricultural areas who could use the greatest amount of the yard waste.

One other avenue that needs to be encouraged is not collecting yard waste in the first place. Many state and county extension offices provide workshops and encourage the "Don't Bag It" program. This program educates people on why not to collect grass clippings and leaves from their yards. This is source reduction at the source. If home owners stop bagging their grass clippings and leaves all together, then there will be no yard waste to worry about.

The biggest obstacle to recycling and composting yard waste is changing the mind set of the public. They need to be made aware of the importance of waste reduction and specifically reduction of yard waste. It was not that long ago when people began recycling paper, then aluminum cans, and now the major goal is yard waste.

The legislation to ban yard waste is new and its success is yet to be determined. There is a long way to go but some states are the pioneers to a new way of living. It is a way of life which all of us will have to deal with in the future if we don't reduce the amount of solid waste we produce. We must find alternative uses or reuses for waste and we must understand the importance of waste stream reduction. This will give us the motivation to succeed.

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APPENDIX

APPENDIX - A

H.R. 2292

EXECUTIVE COMPOSTING ACT

103D CONGRESS
1ST SESSION

H. R. 2292

To express the sense of the Congress to encourage the President and the Governor of each State to carry out on-site composting at their residences.

IN THE HOUSE OF REPRESENTATIVES

MAY 26, 1993

Mr. HOCHBRUECKNER (for himself, Mr. TORRES, Mr. FISH, Ms. NORTON, Mr. WALSH, and Ms. MCKINNEY) introduced the following bill; which was referred to the Committee on Energy and Commerce

---

A BILL

To express the sense of the Congress to encourage the President and the Governor of each State to carry out on-site composting at their residences.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Executive Composting Act".

SEC. 2. FINDINGS.

The Congress finds the following:

(1) The United States faces a crisis in municipal solid waste management, due in large part to

rapidly declining landfill capacity and growing public concern about the adverse environmental consequences of waste disposal.

(2) Composting, an ancient technique that promotes natural decomposition of biodegradable materials, could be used to manage as much as 60 percent of municipal discards, including such items as fallen leaves, grass clippings, woody materials, and post-consumer organic materials that are not suitable for municipal recycling programs. Homeowners can naturally recycle their yard trimmings and kitchen food scraps through backyard composting, thus substantially reducing the amount of materials they discard.

(3) Finished compost material provides a valuable soil amendment that can improve soil quality and stability, help prevent soil erosion, and reduce the demand for chemical fertilizers. Homeowners can use compost produced from backyard composting in outdoor landscaping or as soil for houseplants.

(4) The President of the United States and the Nation's Governors, uniquely positioned to lead by example, can provide a model for citizen involvement by composting their organic yard trimmings and food scraps that are not suitable for recycling pro-

grams. Such programs could include distribution of the finished compost material to the public for use in gardens and other appropriate purposes.

(5) A backyard composting effort at the White House and at Governors' residences would demonstrate to citizens that each household has a role to play in the solid waste solution, a component of which may be recovering organic materials through backyard composting.

(6) Backyard composting at the Federal and State executive residences would also set a positive example for Federal and State government agencies, and could encourage composting of organic materials on government office grounds.

SEC. 3. SENSE OF THE CONGRESS.

It is the sense of the Congress that, in order to encourage backyard composting across the Nation, the President and the Governor of each State should consider carrying out on-site composting of organic materials generated at their residences and grounds that is appropriate for composting, including yard trimmings, kitchen food scraps, and other organic materials that are not suitable for recycling programs. The President and each Governor also should consider distributing the resulting compost to

visitors and local residents for use in gardens and other appropriate purposes.

○

APPENDIX - B

ORGANIC WASTE COMPOSTING

MODEL STATE REGULATIONS

A COMPOSTING COUNCIL FACT SHEET

ORGANIC WASTE COMPOSTING

MODEL STATE REGULATIONS

DRAFT - 20 JUNE 1994

REGULATIONS OF THE STATE OF_____
CHAPTER_____, SOLID WASTE MANAGEMENT

SUBCHAPTER_____, YARD WASTE, SOURCE-SEPARATED ORGANIC WASTE, AND SOLID WASTE COMPOSTING

Changes from the 1 January 1994 draft: the Standards Committee of the Council has refined the test methods of Table 1, added more explanatory text to Table 1 and to the notes to Tables 1 and 2. Also, metals limits in Table 2 now reflect current 40 CFR Part 503 limits. Recommended USDA limits, which were in Table 2, now appear in note 8 to Table 2.

ORGANIC WASTE COMPOSTING

MODEL STATE REGULATION

THE COMPOSTING COUNCIL, 114 S. PITT ST, ALEXANDRIA VA 22314, 703 739 2401

DRAFT - 20 JUNE 1994

REGULATIONS OF THE STATE OF_____
CHAPTER_____, SOLID WASTE MANAGEMENT

SUBCHAPTER_____, YARD WASTE, SOURCE-SEPARATED ORGANIC WASTE, AND SOLID WASTE COMPOSTING

1. SCOPE AND APPLICABILITY

(A) This subchapter shall constitute the rules of [the Department] governing the design, permitting, construction, operation, maintenance, and product distribution for facilities which receive and process yard waste, source-separated organic waste, and solid waste for aerobic composting as defined in this subchapter.

2. DEFINITIONS

(A) "Compostable" means able to undergo physical, chemical, thermal and/or biological degradation under aerobic conditions in a composting facility, such that it enters into and is physically indistinguishable from the finished compost (humus), and which ultimately mineralizes (biodegrades to carbon dioxide, water, and biomass) in the environment at a rate like that of known compostable materials such as paper and yard trimmings.

(B) "Composting" is the controlled biological degradation of organic matter to make compost.

(C) "Curing" is the last stage of composting that occurs after much of the readily metabolized material has decomposed. It provides for additional stabilization.

(D) "Leachate" is a liquid which has come in contact with or percolated through a porous solid and extracted dissolved and suspended material. Condensate from gases that pass through a porous solid may also contain dissolved or suspended material.

(E) "Recyclables", for the purposes of this Subchapter, are materials contained in the incoming wastes which can be recovered from the waste stream for use.

(F) "Solid waste", for the purposes of this Subchapter, means garbage or refuse and other discarded solid material that would, unless recycled, be disposed. It includes material resulting from residential, commercial and institutional activities, but does not include:

(1) Regulated medical waste,

(2) Hazardous waste,

(3) Municipal sewage sludge,

(4) Industrial nonhazardous solid waste, or

(5) Manures.

(G) "Source-separated organic waste" is organic material that has been separated from noncompostable material at the point of generation. It may include materials such as, but not limited to, food waste, food processing waste, soiled or unrecyclable paper, other compostable materials, or yard waste in combination with these materials.

(H) "Vegetative food waste" is food waste and food processing waste from materials such as fruits, vegetables, and grains. It does not include animal products or byproducts, such as dairy products, animal fat, bones, or meat.

(I) "Yard waste" is vegetative matter and includes materials such as, but not limited to, grass clippings, leaves, and brush. It does not include materials such as food waste, food processing waste, or soiled paper.

3. FACILITY DESIGN PLAN

(A) For facilities receiving only yard waste:

(1) The design plan should include a flow diagram of the proposed processing steps.

(2) The active composting surface must be an improved surface, such as compacted yellow clay, gap-graded crushed aggregate, asphalt or other such surface that can withstand heavy equipment use. The surface must be sloped to prevent ponding of liquids and to prevent surface water from entering waterways.

(3) Facility design plan should include the following:

(a) Topographic map (US Geological Survey 7.5 minute series) of the area.

(b) 100-year floodplain map (if applicable) of the area.

(c) Site plan showing dimensions and details of the proposed receiving, processing, production, curing and storage areas; and

(d) Detailed engineering drawings of the site that indicate location of initial and permanent roads; buildings and equipment to be installed; fences and gates; landscaping; sewer and water lines; and storm water system. The drawings shall show final grade contours.

(4) Facility design plan must address management of storm water:

(a) Storm water management systems must be designed to meet Federal storm water regulations and to prevent run-off from entering receiving, processing, curing, or storage areas.

(5) Facility design plan should detail where necessary:

(a) effective barriers to unauthorized entry and dumping (fencing, gates, locks);

(b) all-weather access roads to the site;

(c) appropriate signs (at facility entrance, directing traffic flow, public information);

(d) access to scales, if applicable;

(e) methods for achieving odor control;

(f) noise control;

(g) vector, dust, and litter control; and

(h) fire protection and control features.

(6) Facility shall have sufficient capacity to handle projected incoming volumes of yard waste.

(7) Facility design must address specific storage issues, including:

(a) capacity for incoming wastes waiting to be processed (3 days);

(b) capacity for proper handling, storage, and removal of hazardous or other non-permitted wastes delivered to or generated by the facility; and

(c) capacity for finished compost storage, not to exceed 15 months' production.

(8) Facility shall have sufficient structural support for operations (waste, equipment, buildings, etc.).

(9) Design plan should include provisions for operations during wind, heavy rain, snow, freezing or other inclement weather conditions.

(10) Design plan should address employee safety issues according to State and Federal requirements.

(B) For facilities receiving source-separated organic waste:

(1) Design plan should include a flow diagram of the proposed processing steps involved in recovering and processing source-separated organic waste, and provide a total mass balance.

(2) Proposed equipment to be used in composting must be described, including equipment specifications and manufacturers' performance standards. Indicate that proposed equipment is compatible with proposed process and throughput.

(3) Composting structure must withstand wear and tear of normal operations. Floor structure must be impermeable (10^{-7} cm/sec) and be sloped to prevent ponding of liquids and to direct leachate to leachate collection system. Leachate control must be provided wherever leachate is generated.

(4) Facility design plan should include the following:

(a) Topographic map (US Geological Survey 7.5 minute series) of the area, indicating the facility boundary, the property boundary, and existing utilities and structures within 500 feet from facility site or within 1000 feet if the waste handling process is not enclosed within a building;

(b) 100-year floodplain map (if applicable) of the area. Most recent US Geological Survey, Army Corps of Engineers or Federal Insurance Administration 100-year frequency floodplain maps may be used;

(c) Site plan showing dimensions and details of the proposed receiving, processing, production, curing and storage areas;

(d) Detailed engineering drawings of the site that indicate the location of initial and permanent roads; buildings and equipment to be installed; fences and gates; landscaping; sewer and water lines; and storm water system. These drawings shall show final grade contours; and

(e) Profile views of the site indicating access roads, water drainage (swales, ditches, etc.), existing and final grade, facility superstructure, utilities, transfer trailer and other structures.

(5) Facility design plan must address management of storm water and leachate:

(a) Storm water management systems must be designed to meet Federal storm water regulations and to prevent run-off from entering receiving, processing, curing, or storage areas.

(b) Storm water which does come in contact with waste shall be considered leachate.

(c) Leachate collection and removal system designed for reuse in processing or treatment as dictated by local authorities.

(6) Facility design plan must detail:

(a) effective barriers to unauthorized entry and dumping (fencing, gates, locks);

(b) all-weather access roads to the site;

(c) appropriate signs (at facility entrance, directing traffic flow, public information);

(d) access to scales, if applicable;

(e) equipment and methods for achieving odor control;

(f) noise control;

(g) vector, dust, and litter control; and

(h) fire protection and control features.

(7) Facility shall have sufficient capacity to handle projected incoming volumes of waste.

(8) Facility design must address specific storage issues, including:

(a) capacity for incoming wastes waiting to be processed (3 days plus contingency storage);

(b) capacity for proper handling, storage, and removal of hazardous or other non-permitted wastes delivered to or generated by the facility; and

(c) capacity for finished compost storage, not to exceed 15 months' production, in accordance with the marketing plan, Section 6.

(9) Facility shall have sufficient structural support for operations (waste, equipment, buildings, etc.).

(10) Design plan should include provisions for operations during wind, heavy rain, snow, freezing or other inclement weather conditions.

(11) Design plan should address employee safety issues according to State and Federal requirements including:

(a) equipment safety features and ergonomic designs;

(b) dust, odor, noise and vector control;

(c) fire and explosion prevention and control features;

(d) adequate building ventilation; and

(e) required personal protective equipment.

(C) For facilities receiving solid waste:

(1) Design plan should include a flow diagram of the proposed processing steps involved in recovering recyclable materials and mixed organic material from solid waste, and provide a total mass balance.

(2) Proposed equipment to be used in composting must be described, including equipment specifications and manufacturers' performance standards. Indicate that proposed equipment is compatible with proposed process and throughput.

(3) Composting structure must withstand wear and tear of normal operations. A roof shall cover the receiving, processing, production and curing areas. Floor structure must be impermeable (10^{-7} cm/sec) and be sloped to prevent ponding of liquids and to direct leachate to leachate collection system. Leachate control must be provided wherever leachate is generated.

(4) Facility design plan should include the following:

(a) Topographic map (US Geological Survey 7.5 minute series) of the area, indicating the facility boundary, the property boundary, and existing utilities and structures within 500 feet from facility site or within 1000 feet if the waste handling process is not enclosed within a building;

(b) 100-year floodplain map (if applicable) of the area. Most recent US Geological Survey, Army Corps of Engineers or Federal Insurance Administration 100-year frequency floodplain maps may be used;

(c) Site plan showing dimensions and details of the proposed receiving, processing, production, curing and storage areas;

(d) Detailed engineering drawings of the site, certified by a professional engineer qualified to practice in the State of [...], that indicate the location of initial and permanent roads; buildings and equipment to be installed; fences and gates; landscaping; sewer and water lines; and storm water system. These drawings shall show final grade contours; and

(e) Profile views of the site indicating access roads, water drainage (swales, ditches, etc.), existing and final grade, facility superstructure, utilities, transfer trailer and other structures.

(5) Facility design plan must address management of storm water and leachate:

(a) Storm water management systems must be designed to meet Federal storm water regulations and to prevent run-off from entering receiving, processing, curing, or storage areas.

(b) Storm water which does come in contact with waste shall be considered leachate.

(c) Leachate collection and removal system designed for reuse in processing or treatment as dictated by local authorities.

(6) Facility design plan must detail:

(a) effective barriers to unauthorized entry and dumping (fencing, gates, locks);

(b) all-weather access roads to the site;

(c) appropriate signs (at facility entrance, directing traffic flow, public information);

(d) access to scales, if applicable;

(e) equipment and methods for achieving odor control;

(f) noise control;

(g) vector, dust, and litter control; and

(h) fire protection and control features.

(7) Facility shall have sufficient capacity to handle projected incoming volumes of waste.

(8) Facility design must address specific storage issues, including:

(a) capacity for incoming wastes waiting to be processed (3 days plus contingency storage);

(b) capacity for proper handling, storage, and removal of hazardous or other non-permitted wastes delivered to or generated by the facility; and

(c) capacity for finished compost storage, not to exceed 15 months' production, in accordance with the marketing plan, Section 6.

(9) Facility shall have sufficient structural support for operations (waste, equipment, buildings, etc.).

(10) Design plan should include provisions for operations during wind, heavy rain, snow, freezing or other inclement weather conditions.

(11) Design plan should address employee safety issues according to State and Federal requirements including:

(a) equipment safety features and ergonomic designs;

(b) dust, odor, noise and vector control;

(c) fire and explosion prevention and control features;

(d) adequate building ventilation; and

(e) required personal protective equipment.

4. PERMITTING

(A) For facilities receiving only yard waste:

(1) The facility developer must submit to [the Department] the following materials for approval:

(a) Facility Design Plan as outlined in Section 3;

(b) Operations Plan as outlined in Section 6; and

(c) Facility Closure Plan as outlined in Section 12.

(2) Facility developer must conform to all applicable permits and regulations.

(3) If within 60 calendar days of submission of a complete permit application [the Department] does not take action, the permit shall be deemed approved.

(4) Permit by Rule

(a) A facility shall be deemed to have a permit for the purposes of this subtitle if it is registered, constructed and operating in compliance with the requirements of these regulations and meets the following condition:

(i) The facility receives only yard waste, on a maximum of 3 acres, and receives no more than 10,000 cubic yards, with less than a 15% rate of grass clippings, per acre per annum.

(b) Not less than 90 days prior to accepting yard waste, the facility developer must submit to [the Department] a registration form and the following materials:

(i) A site plan including property up to 500 feet beyond the facility boundaries; and

(ii) A notarized statement certifying that the information in the registration and site plan is true and accurate, and that the facility will be constructed and operated in compliance with these regulations.

(c) A permit granted by this Article is considered a yard waste composting facility permit and is subject to all inspection and enforcement provisions of this chapter.

(5) Procedures for modifying the permit are found in Section 13.

(B) For facilities receiving source-separated organic waste:

(1) The facility developer must submit to [the Department] the following materials for approval:

(a) Facility Design Plan as outlined in Section 3;

(b) Operations Plan as outlined in Section 6;

(c) Operator Training Manual as outlined in Section 8, unless the facility will meet the conditions for Permit by Rule as outlined in Section 4;

(d) Operations Manual as outlined in Section 7, unless the facility will meet the conditions for Permit by Rule as outlined in Section 4; and

(e) Facility Closure Plan as outlined in Section 12.

(2) Facility developer must conform to all applicable permits and regulations.

(3) [The Department] must respond within ___days on the completeness of the application.

(4) Permit by Rule

(a) A facility shall be deemed to have a permit for the purposes of this subtitle if it is registered, constructed and operating in compliance with the requirements of these regulations and meets the following condition:

(i) The facility receives only source-separated organic waste, on a maximum of 3 acres, and receives no more than 3,000 cubic yards, with less than a 10% mix of the sum of food waste, food processing waste, and grass clippings, per acre per annum, and all food waste and food processing waste is vegetative food waste.

(b) Not less than 90 days prior to accepting source-separated organic waste, the facility developer must submit to [the Department] a registration form and the following materials:

(i) A site plan including property up to 500 feet beyond the facility boundaries; and

(ii) A notarized statement certifying that the information in the registration and site plan is true and accurate, and that the facility will be constructed and operated in compliance with these regulations.

(c) A permit granted by this Article is considered a source-separated organic waste composting facility permit and is subject to all inspection and enforcement provisions of this chapter.

(5) Procedures for modifying the permit are found in Section 13.

(C) For facilities receiving solid waste:

(1) The facility developer must submit to [the Department] the following materials for approval:

(a) Facility Design Plan as outlined in Section 3;

(b) Operations Plan as outlined in Section 6;

(c) Operator Training Manual as outlined in Section 8;

(d) Operations Manual as outlined in Section 7; and

(e) Facility Closure Plan as outlined in Section 12.

(2) Facility developer must conform to all applicable permits and regulations.

(3) [The Department] must respond within ___ days on the completeness of the application.

(4) Procedures for modifying the permit are found in Section 13.

5. Record Keeping and Reporting Requirements

(A) For facilities receiving only yard waste:

(1) Information available for inspection by [the Department], during normal business hours, shall include:

(a) results of compost analysis and name(s) of certified laboratory(ies) used;

(b) quantity, type and source of incoming waste;

(c) quantity and types of recovered recyclables, as appropriate;

(d) quantity of disposed residue, and sites; and

(e) standard procedures to assure data reliability.

(B) For facilities receiving source-separated organic waste:

(1) Quarterly reports must be submitted to [the Department] within 30 days after the end of each quarterly period. If the facility meets the requirements for Permit by Rule as outlined in Section 4, annual reports only must be submitted to [the Department] within 30 days after the end of each year. Information provided to [the Department] shall include:

(a) results of compost analysis and name(s) of certified laboratory(ies) used;

(b) quantity, type and source of incoming waste;

(c) quantity and types of recovered recyclables, as appropriate;

(d) quantity of compost produced;

(e) quantity, before blending, of compost sold/distributed, and markets;

(f) quantity of disposed residue, and sites;

(g) daily temperature readings and retention times during PFRP;

(h) summary of leachate management (collected, reused, and treated/disposed);

(i) summary of major maintenance on leachate, temperature or other monitoring and control systems in operation; and

(j) standard procedures to assure data reliability.

(C) For facilities receiving solid waste:

(1) Quarterly reports must be submitted to [the Department] within 30 days after the end of each quarterly period. Information provided to [the Department] shall include:

(a) results of compost analysis and name(s) of certified laboratory(ies) used;

(b) quantity, type and source of incoming waste;

(c) quantity and types of recovered recyclables;
(d) quantity of compost produced;

(e) quantity, before blending, of compost sold/distributed, and markets;

(f) quantity of disposed residue, and sites;

(g) daily temperature readings and retention times during PFRP;

(h) summary of leachate management (collected, reused, and treated/disposed);

(i) summary of major maintenance on leachate, temperature or other monitoring and control systems in operation; and

(j) standard procedures to assure data reliability.

6. OPERATIONS PLAN

(A) For facilities receiving only yard waste:

(1) An Operations Plan for the facility shall be prepared, containing the following information:

(a) A description of the anticipated quantity and variation throughout the year of waste to be received;

(b) designation of persons responsible for operation, control and maintenance of facility;

(c) methods for measuring incoming waste,

(d) methods to control the types of waste received (e.g. inspection procedures);

(e) methods for removing and recovering for recycling or disposing of noncompostable wastes from the incoming waste stream, including procedures for removal, storage and disposal of any hazardous wastes;

(f) methods to control traffic and to expedite unloading;

(g) methods to minimize, manage and monitor odors;

(h) leachate and National Pollutant Discharge Elimination System storm water control measures;

(i) vector, dust and litter control measures;

(j) designation of disposal sites for noncompostable wastes; and

(k) plans for marketing the finished compost.

(B) For facilities receiving source-separated organic waste:

(1) An Operations Plan for the facility shall be prepared, containing the following information:

(a) A description of the anticipated types, quantity, variation over time, and sources of waste to be received and a description of any additives used in the process;

(b) designation of persons responsible for operation, control and maintenance of facility;

(c) methods for measuring incoming waste;

(d) methods to control the types of waste received (e.g. inspection procedures);

(e) methods for removing and recovering for recycling or disposing of noncompostable wastes from the incoming waste stream, including procedures for removal, storage and disposal of any hazardous wastes;

(f) methods to control traffic and to expedite unloading;

(g) methods to maintain biological conditions;

(h) methods to minimize, manage and monitor odors;

(i) leachate and National Pollutant Discharge Elimination System storm water control measures;

(j) vector, dust and litter control measures;

(k) contingency operations plan (in the event of equipment failure, power outages, natural disasters, fire, receipt of prohibited materials), including designation of permitted disposal sites for incoming waste, leachate, and for hazardous wastes;

(l) plans for monitoring, sampling and testing the composting materials for process control and product quality assurance as specified in Section 10 below; and

(m) plans for marketing the finished compost.

(C) For facilities receiving solid waste:

(1) An Operations Plan for the facility shall be prepared, containing the following information:

(a) A description of the anticipated types, quantity, variation over time, and sources of waste to be received and a description of any additives used in the process;

(b) designation of persons responsible for operation, control and maintenance of facility;

(c) methods for measuring incoming waste;

(d) methods to control the types of waste received (e.g. inspection procedures);
(e) methods for removing and recovering for recycling or disposing of noncompostable wastes from the incoming waste stream, including procedures for removal, storage and disposal of any hazardous wastes;

(f) methods to control traffic and to expedite unloading;

(g) methods to maintain biological conditions;

(h) methods to minimize, manage and monitor odors;

(i) leachate and National Pollutant Discharge Elimination System storm water control measures;

(j) vector, dust and litter control measures;

(k) contingency operations plan (in the event of equipment failure, power outages, natural disasters, fire, receipt of prohibited materials), including designation of permitted disposal sites for incoming waste, leachate, and for hazardous wastes;

(l) plans for monitoring, sampling and testing the composting materials for process control and product quality assurance as specified in Section 10 below; and

(m) plans for marketing the finished compost.

7. OPERATIONS MANUAL

(A) For facilities receiving source-separated organic waste:

(1) If the facility does not meet the requirements for Permit by Rule, as outlined in Section 4, an Operations Manual of policies and procedures specific to the facility will be prepared, updated as needed, and available at the facility for regulatory inspection. It should include any and all information that enables supervisory and operating personnel to determine sequence of operations, routine maintenance schedules, plans, policies, procedures, and legal requirements that must be adhered to.

(2) Operation of facility equipment shall conform to manufacturer/vendor specifications or to appropriately documented modifications. These specifications and/or modifications are to be included in the Operations Manual.

(B) For facilities receiving solid waste:

(1) An Operations Manual of policies and procedures specific to the facility will be prepared, updated as needed, and available at the facility for regulatory inspection. It should include any and all information that enables supervisory and operating personnel to determine sequence of operations, routine maintenance schedules, plans, policies, procedures, and legal requirements that must be adhered to.

(2) Operation of facility equipment shall conform to manufacturer/vendor specifications or to appropriately documented modifications. These specifications and/or modifications are to be included in the Operations Manual.

8. OPERATOR TRAINING

(A) For facilities receiving source-separated organic waste:

(1) Employees shall be properly trained in appropriate facility operations, maintenance procedures, and safety and emergency procedures.

(2) If the facility does not meet the requirements for Permit by Rule, as outlined in Section 4, a facility-specific Training Manual shall be developed and made available to each employee.

(B) For facilities receiving solid waste:

(1) Employees shall be properly trained in appropriate facility operations, maintenance procedures, and safety and emergency procedures.

(2) A facility-specific Training Manual shall be developed and made available to each employee.

9. FACILITY OPERATIONS

(A) For facilities receiving only yard waste:

(1) If the incoming waste contains grass, processing of that waste shall begin within 24 hours.

(2) Operation of facility shall be under supervision and control of a properly trained individual during all hours of operation, and access to facility will be prohibited when facility is closed.

(3) Records/logs of facility operations will be kept for 3 years, including:

(a) measurement of waste received daily;

(b) source of waste received daily; and

(c) lab analysis per Section 10.

(B) For facilities receiving source-separated organic waste:

(1) The composting process shall meet the criteria for a process to further reduce pathogens (PFRP) as provided by the US EPA (40 CFR Part 257). Three methods are accepted:

(a) Windrow method, which meets PFRP as follows;

(i) maintain aerobic conditions; and

(ii) a minimum of 5 turnings over 15 consecutive days, maintaining a temperature of not less that 55°C/131°F.

(b) Aerated static pile method meets PFRP as follows:

(i) pile insulated with 6" to 12" of insulating material (e.g. sawdust, cured compost, or wood chips); and

(ii) temperature of at least 55°C/131°F maintained throughout mixture for 3 consecutive days.

(c) Enclosed (within) vessel composting method meets PFRP by:

(i) temperature maintained at 55°C/131°F throughout mixture for at least 3 consecutive days.

(d) Any future PFRP provided by Federal or State regulation.

(2) Facility shall monitor temperature of composting materials to ensure that pathogen reduction criteria are met. Temperature readings shall be recorded daily during PFRP.

(3) Processing of incoming waste shall begin within 3 days, or the waste shall be disposed. If the incoming waste contains grass, processing of that waste shall begin within 24 hours, or that waste shall be disposed. (4) Incoming, unprocessed waste will not be mixed with finished compost.

(5) Stored finished compost that is not used or sold within 15 months shall be removed or reprocessed for use or sale.

(6) Operation of facility shall be under supervision and control of properly trained individual during all hours of operation, and access to facility will be prohibited when facility is closed.

(7) Records/logs of facility operations will be kept for 5 years, including:

(a) daily temperature and moisture monitoring of the composting process;

(b) measurement of waste received daily;

(c) source of waste received daily;

(d) lab analyses per Section 10;

(e) retention time of the composted material; and

(f) sale and distribution of recovered materials.

(C) For facilities receiving solid waste:

(1) The composting process shall meet the criteria for a process to further reduce pathogens (PFRP) as provided by the US EPA (40 CFR Part 257). Three methods are accepted:

(a) Windrow method, which meets PFRP as follows;

(i) maintain aerobic conditions; and

(ii) a minimum of 5 turnings over 15 consecutive days, maintaining a temperature of not less that 55°C/131°F.

(b) Aerated static pile method meets PFRP as follows:

(i) pile insulated with 6" to 12" of insulating material (e.g. sawdust, cured compost, or wood chips); and

(ii) temperature of at least 55°C/131°F maintained throughout mixture for 3 consecutive days.

(c) Enclosed (within) vessel composting method meets PFRP by:

(i) temperature maintained at 55°C/131°F throughout mixture for at least 3 consecutive days.

(d) Any future PFRP provided by Federal or State regulation.

(2) Facility shall monitor temperature of composting materials to ensure that pathogen reduction criteria are met. Temperature readings shall be recorded daily during PFRP.

(3) Processing of incoming waste shall begin within 3 days or that waste shall be disposed. If the incoming waste contains grass, processing of that waste shall begin within 24 hours, or that waste shall be disposed.

(4) Incoming, unprocessed waste will not be mixed with finished compost.

(5) Stored finished compost that is not used or sold within 15 months shall be removed or reprocessed for use or sale.

(6) Operation of facility shall be under supervision and control of properly trained individual during all hours of operation, and access to facility will be prohibited when facility is closed.

(7) Records/logs of facility operations will be kept for 5 years, including:

(a) daily temperature and moisture monitoring of the composting process;

(b) measurement of waste received daily;

(c) source of waste received daily;

(d) lab analyses per Section 10;

(e) retention time of the composted material; and

(f) sale and distribution of recovered materials.

10. TESTING

(A) For facilities receiving only yard waste:

(1) Finished compost will be tested once every quarter. If the finished compost falls within the testing limits set forth in Table 2 during the first two years of operation, testing will only be required once per year provided that the results of the testing continue to fall within the limits of the parameters of Table 2.

(a) An alternate sampling schedule can be petitioned from [the Department] if the facility can demonstrate that less frequent testing will comply with requirements for health, safety and the environment.

(2) Test results shall be available for inspection upon request during normal business hours of operation.

(B) For facilities receiving source-separated organic waste:

(1) Composting facilities shall develop a Quality Assurance/Quality Control plan to be included with the Operations Plan outlined in Section 6. This will outline the monitoring, sampling and analysis plans for testing the compost process and product.

(2) [The Department] will set an appropriate monitoring and sampling schedule for the startup period (1 year) as part of the facility permit.

(3) Using information gained during the startup period, a monitoring and sampling schedule for ongoing operations will be developed with [the Department] based on statistical methods for quality assurance.

(4) Compost samples shall be obtained in accordance with the approved plan. Samples of the compost produced at the facility shall be analyzed for the parameters listed in Table 1 according to the indicated method.

(5) Results of all laboratory analysis for each parameter specified in Table 1 shall be recorded and maintained at the facility. Quality results shall be reported to [the Department] as specified in Section 5.

(C) For facilities receiving solid waste:

(1) Composting facilities shall develop a Quality Assurance/Quality Control plan to be included with the Operations Plan outlined in Section 6. This will outline the monitoring, sampling and analysis plans for testing the compost process and product.

(2) [The Department] will set an appropriate monitoring and sampling schedule for the startup period (1 year) as part of the facility permit.

(3) Using information gained during the startup period, a monitoring and sampling schedule for ongoing operations will be developed with [the Department] based on statistical methods for quality assurance.

(4) Compost samples shall be obtained in accordance with the approved plan. Samples of the compost produced at the facility shall be analyzed for the parameters listed in Table 1 according to the indicated method.

(5) Results of all laboratory analysis for each parameter specified in Table 1 shall be recorded and maintained at the facility. Quality results shall be reported to [the Department] as specified in Section 5.

11. Compost Utilization

(A) Compost offered for sale must contain a label indicating recommended safe uses and application rates, and restrictions, if any, on use of the product. If compost is offered for bulk sale, signs or printed literature must be available with this information.

(B) Utilization of compost is governed by the parameters outlined in Table 2. Compost parameter limits are set to protect public health and safety and to protect the environment. Compost may be further graded for market use. Any material not meeting the parameter limits in Table 2 may be used only as authorized by [the Department], or it must be disposed.

(C) Persons wishing to apply material exceeding parameter limits in Table 2 must show that site-specific soil conditions will allow application without endangering the public or the environment, under procedures outlined in Section 13.

12. Facility Closure

(A) For facilities receiving only yard waste:

(1) The facility will submit, as condition for permit or licensure, a final closure plan containing a schedule and description of the steps necessary to close the facility and financial assurance information.

(2) The facility shall notify [the Department] in writing at least 60 days prior to the proposed termination date for the facility.

(3) The facility will publish notice of closure in a newspaper of general circulation in the county where the facility is located and in counties or communities sending at least 25 percent of their waste to the facility. Such notice will be published at least 15 days prior to closure.

(4) Within 30 days of ceasing operation, all residuals, waste and recyclables shall be removed from the site and recycled or disposed.

(5) A composting facility shall be considered finally closed when all the requirements of the closure plan have been met.

(B) For facilities receiving source-separated organic waste:

(1) The facility will submit, as condition for permit or licensure, a final closure plan containing a schedule and description of the steps necessary to close the facility and financial assurance information.

(2) An updated final closure plan will be submitted in writing at least 180 days prior to the proposed termination date for the facility.

(3) The facility shall notify [the Department] in writing at least 60 days prior to the proposed termination date for the facility.

(4) The facility will publish notice of closure in a newspaper of general circulation in the county where the facility is located and in counties or communities sending at least 25 percent of their waste to the facility. Such notice will be published at least 30 days prior to closure.

(5) Within 10 days of ceasing operation, all residuals and waste shall be removed from the site and recycled or disposed and the facility will arrange for a final cleaning of any containers, equipment, machines, floors and facility surfaces having come in contact with source-separated organic waste or solid waste.

(6) A composting facility shall be considered finally closed when all the requirements of the closure plan have been met.

(C) For facilities receiving solid waste:

(1) The facility will submit, as condition for permit or licensure, a final closure plan containing a schedule and description of the steps necessary to close the facility and financial assurance information.

(2) An updated final closure plan will be submitted in writing at least 180 days prior to the proposed termination date for the facility.

(3) The facility shall notify [the Department] in writing at least 60 days prior to the proposed termination date for the facility.

(4) The facility will publish notice of closure in a newspaper of general circulation in the county where the facility is located and in counties or communities sending at least 25 percent of their waste to the facility. Such notice will be published at least 30 days prior to closure.

(5) Within 10 days of ceasing operation, all residuals and waste shall be removed from the site and recycled or disposed and the facility will arrange for a final cleaning of any containers, equipment, machines, floors and facility surfaces having come in contact with source-separated organic waste or solid waste.

(6) A composting facility shall be considered finally closed when all the requirements of the closure plan have been met.

13. Approval of Pilot Projects, Alternate Procedures and/or Requirements

(A) The owner or operator of a composting facility may request in writing a determination by [the Department] that a given requirement not apply to the facility or the compost that is produced, and shall request approval of pilot projects, alternative procedures and/or requirements.

(B) The request shall set forth at a minimum the following information:

(1) the specific facility for which the exception is requested;

(2) the specific provisions of the regulations from which exception is sought;

(3) the basis for the exception;

(4) the alternate procedure or requirement for which approval is requested and documentation that this procedure or requirement provides an equal degree of protection for the public and the environment; and

(5) documentation of the effectiveness of the proposed alternate procedure.

(C) [The Department] shall approve or deny each alternative procedure or requirement for an individual facility, in consultation with local authorities as needed, with the objective of minimum regulation necessary to protect public health and safety and to maintain nuisance control.

(D) [The Department] must respond on the completeness of the application within ___ days..

TABLE 1. COMPOST QUALITY VERIFICATION

Suggested Minimum Standards
For the Protection of Public Health, Safety and the Environment

PARAMETER	UNIT	TEST METHOD
Stability - respirometry[1]		
O_2 consumed	mg O_2/kg VS*/hr	Draft test definition[2]
Soluble salts - electrical conductivity[3]	mmhos/cm	NCR Publication 221, Method 14[4]
Pathogens[5]	PFRP[6]	EPA, 40 CFR Part 503 Appendix B(B)(1)[7]
fecal coliform[8]	MPN[9]/g	Standard Methods 9221 E. Fecal Coliform Procedure[10] or 9222 D. Fecal Coliform Membrane Filter Procedure
salmonella[11]	MPN/4 g	Standard Methods 9260 D. Quantitative *Salmonella* Procedures
pH[12]		EPA Method 9045A Soil pH[13] or NCR Publication 221, Method 14
Regulated chemicals per USEPA "Alternate Pollutant Limit"[14]:		
Arsenic (As)[15]	mg/kg dry wt.	EPA Method 3050 Acid Digestion of Sediments, Sludges, and Soils, and 6010A Inductively Coupled Plasma Atomic Emission Spectroscopy
Cadmium (Cd)[17]	mg/kg dry wt.	EPA Method 3050 Acid Digestion of Sediments. Sludges, and Soils, and 6010A Inductively Coupled Plasma Atomic Emission Spectroscopy
Chromium (Cr)[18]	mg/kg dry wt.	EPA Method 3050 Acid Digestion of Sediments, Sludges, and Soils, and 6010A Inductively Coupled Plasma Atomic Emission Spectroscopy
Copper (Cu)[19]	mg/kg dry wt.	EPA Method 3050 Acid Digestion of Sediments, Sludges, and Soils, and 6010A Inductively Coupled Plasma Atomic Emission Spectroscopy
Lead (Pb)[20]	mg/kg dry wt.	EPA Method 3050 Acid Digestion of Sediments, Sludges, and Soils, and 6010A Inductively Coupled Plasma Atomic Emission Spectroscopy
Mercury (Hg)[21]	mg/kg dry wt.	EPA Method 7471A Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)
Molybdenum (Mo)[22]	mg/kg dry wt.	EPA Method 3050 Acid Digestion of Sediments, Sludges, and Soils, and 6010A Inductively Coupled Plasma Atomic Emission Spectroscopy
Nickel (Ni)[23]	mg/kg dry wt.	EPA Method 3050 Acid Digestion of Sediments, Sludges, and Soils, and 6010A Inductively Coupled Plasma Atomic Emission Spectroscopy
Selenium (Se)[24]	mg/kg dry wt.	EPA Method 3050 and 7740 Selenium (AA, Furnace Technique)
Zinc (Zn)[25]	mg/kg dry wt.	EPA Method 3050 Acid Digestion of Sediments, Sludges, and Soils, and 6010A Inductively Coupled Plasma Atomic Emission Spectroscopy
Man-Made Inerts > 4 mm, <13 mm[26]	visual	As defined[27]
Film plastic > 4 mm[28]	cm^2/m^3	As defined[29]
Sharps[30]	PRS	Draft PRS[31]

Notes:

* VS (Volatile Solids) assumes man-made inert content does not exceed the product marketing standard of 1.5% dry weight >4 mm, <13 mm size. If inerts exceed 1.5% dry weight, they must be screened off.

1. Respirometry is a measure of biological activity, and can indicate potential for self-heating, odor, and phytotoxicity. Because oxygen uptake correlates to biomass weight reduction status, it is used here as the basis for measuring compliance with weight-based biological, chemical, and physical contaminant concentration limits.

2. Draft test principles for oxygen uptake include:
   (a) splitting the compost sample as received and oven drying (103°C) one sample fraction to determine total solids content,
   (b) taking approximately 125 grams (ODW basis) moist sample material as received, and raising moisture content if necessary to 50%, and mixing with 125 grams (ODW basis) moist reference compost at 50% moisture content, that has known oxygen uptake rate characteristics,
   (c) incubating the sample mix for at least 12 hours at 37°C in an open zip-lock bag, with the bag lying on its side in the incubator to minimize evaporative water loss,
   (d) adding 60 grams ODW basis of incubated mixed sample to a 500 ml Erlenmeyer flask and aerating for 1 hour in a 37°C water bath,
   (e) logging the O_2 uptake, using an on-line PC-XT data logger, by replacing the aeration apparatus after 1 hour with an oxygen sensor and reading every minute for a period of 90 minutes,
   (f) determining the volume air space after the O_2 uptake measurement, by filling the flask with diluted water to the level of the base of the O_2 probe,
   (g) determining rate of oxygen uptake, i. e., slope,
   (h) performing calculations.

3. Electrical conductivity is a measure of soluble salts, and can indicate potential for phytotoxicity.

4. NCR (North Central Regional) Method 14 is contained in *Recommended Test Procedures for Greenhouse Growth Media* North Central Regional Publication Number 221 (Revised), *Recommended Chemical Soil Test Procedures*, Bulletin Number 499 (Revised), October 1988

5. Pathogens are limited to those of human and animal fecal origin, that can be harmful to humans. While the Process to Further Reduce Pathogens (PFRP) guidelines were originally developed to reduce the numbers of human and animal pathogens of fecal origin, the persistence and variability of plant pathogens is probably adversely affected also. Pathogen control applies to all composts, except possibly some from Specialty Waste.

6. PFRP (Process to Further Reduce Pathogens) is a USEPA process standard, rather than a product standard.

7. USEPA regulations specified in the Process to Further Reduce Pathogens (PFRP) found at 40 Code of Federal Regulations Part 530, Appendix B(B)(1), page 9404 with pile heat maintenance as specified at 55°C or higher. Pile heat above 60°C should be avoided, but not to exceed, in order to avoid destruction of the actinomycete microorganisms needed to decompose cellulose, hemicellulose and lignin.

8. Fecal coliform are indicator organisms for fecal pathogens.

9. MPN is Most Probable Number per gram of total solids in the sewage sludge (or compost). MPN is an index of the number of coliform bacteria, reported by the multiple-tube fermentation procedure of the coliform test, that, more

probably than any other number, would give the results shown by the laboratory examination; it is not an actual enumeration. By contrast, direct plating methods such as the membrane filter procedure permit a direct count of coliform colonies. Total solids are the materials in sewage sludge or compost that remain as residue when the sewage sludge or compost is dried at 103 to 105°C.

10. Standard Methods are contained in *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992.

11. Salmonella are disease causing bacteria that affect man and warm blooded animals, and can cause allergic reactions in susceptible humans and sickness including severe diarrhea with discharge of blood.

12. pH can relate to metal and nutrient mobility and availability, apparent compost stability, and phytotoxicity.

13. USEPA (US Environmental Protection Agency) test methods refer to analytical procedures used in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Report SW-846, third edition as revised, November 1992.

14. Alternate Pollutant Limit (APL) identifies quality of land-applied sewage sludge and sludge compost which does not cause significant risk to humans, livestock, or the environment under very conservative worst-case risk assessment scenarios, with unlimited application (> > 1,000 metric tons/hectare). Alternate Pollutant Limits are found in the 40 CFR 503 "Standards for the Use or Disposal of Sewage Sludge" published in the Federal Register (58:9248-9415) on February 19, 1993.

15. Arsenic is a human carcinogen and neurotoxin.

16. AOAC (Association of Analytical Chemists) methods 871.21 and 975.03 are contained in AOAC *Official Methods of Analysis*, 1990, 15th edition.

17. Cadmium can be a human health concern if ingested as a result of plant uptake.

18. According to the USEPA, chromium can potentially cause phytotoxicity, although chromium is not readily taken up and translocated by plants. The USDA has recommended to the USEPA that limits for sludge Cr be removed from the Part 503 rule. As reported by the W-170 Peer Review Committee, no experimental evidence has been reported that sludge Cr causes adverse effects to any component of the ecosystem.

19. Copper can potentially cause phytotoxicity, and can be an animal health concern through direct ingestion.

20. Lead can be a human health concern through direct ingestion.

21. Mercury can be a human health concern if ingested as a result of uptake by some kinds of mushrooms.

22. Molybdenum can be a human health concern through direct ingestion, and an animal health concern through direct ingestion or through plant uptake.

23. Nickel can potentially cause phytotoxicity.

24. Selenium can be a human or animal health concern through consumption of contaminated plants.

25. Zinc can potentially cause phytotoxicity.

26. Man-made inert material includes glass shards and metal fragments that pose a human and animal safety hazard with unprotected exposure or through direct ingestion.

27. Man-made inert content greater than four (4) millimeters will be determined by passing four replicates of 250 cc oven dried (70°C, ±5°) samples of the compost through a four (4) millimeter screen. Material remaining on the screen will be visually inspected, and clearly identifiable man-made inerts, including glass, metal, and hard plastic, will be separated. Material considered injurious will be identified.

28. Film plastic can be a potential hazard to small animals through direct ingestion.

29. Film plastic content greater than four (4) millimeters will be determined by passing four replicates of 250 cc oven dried (70°C, ±5°) samples of the compost through a four (4) millimeter screen. Material remaining on the screen will be visually inspected, and film plastic will be separated. Surface area of film plastic particles in excess of four (4) millimeters will be measured in square centimeters per cubic meter of compost.

30. Sharps include steel sewing needles and straight pins, and stainless steel hypodermic needles in excess of 2 mm that pose a puncture hazard when handled or ingested.

31. PRS (Process to Reduce Sharps) is a Composting Council process standard rather than a product standard. The Composting Council suggested draft Process to Reduce Sharps is as follows:

> Compost product intended for sale or distribution shall be treated for the effective removal of sharps, including steel sewing needles and straight pins, and stainless steel hypodermic needles. Treatment may be any of the following provisions:
>
> (a) by processing feedstock through water flotation after a stage when hypodermic needles will have been separated from the plastic cartridge,
>
> (b) by passing product by magnetic separation devices designed to remove ferrous items during processing, and/or by sifting through a separating device, such as an air flotation fluidized bed separator (destoner) equipped with a punched 2.5± mm round, or equally effective hole-size deck screen, designed for removal of stainless steel hypodermic needles,
>
> (c) by passing product by an eddy current device designed to remove metallic materials.

TABLE 2. COMPOST (GENERAL USE)

Suggested Minimum Standards
For the Protection of Public Health, Safety and the Environment

PARAMETER	PARAMETER LIMIT for General Use Compost only. All limits apply to product leaving manufacturer's site.	
Stability - respirometry (maximum)		
O_2 consumed	[1]mg O_2/kg BVS*/hr	
Soluble salts - electrical conductivity (maximum)	[2]mmhos/cm*	
Pathogens	[3]PFRP	
(Either) fecal coliform	[4]<1000	MPN/g
(or) salmonella	[5]<3	MPN/4 g
pH (range)	[6]5.5 - 8.5	
Regulated chemical pollutant concentrations per USEPA "Alternate Pollutant Limit" (APL)[7]:		
	at 5.5 - 8.5 pH	
Arsenic (As)	[8]41	mg/kg dry wt.
Cadmium (Cd)	[8]39	mg/kg dry wt.
Chromium (Cr)	[9]1200	mg/kg dry wt.
Copper (Cu)	1500	mg/kg dry wt.
Lead (Pb)	300	mg/kg dry wt.
Mercury (Hg)	17	mg/kg dry wt.
Molybdenum (Mo)	[8]18	mg/kg dry wt.
Nickel (Ni)	420	mg/kg dry wt.
Selenium (Se)	[8]36	mg/kg dry wt.
Zinc (Zn)	2800	mg/kg dry wt.
Man-made inerts (maximum) > 4 mm	[10]Non-injurious	
Film plastic > 4 mm	[11]to be determined cm^2/m^3	
Sharps	[12]PRS	

Notes:

* VS (Volatile Solids) assumes man-made inert content does not exceed the product marketing standard of 1.5% dry weight >4 mm, <13 mm size.

1. A respirometry limit has not been set. It will be determined by application of the oxygen uptake rate test method and correlation to biomass/product weight reduction status.

2. Acceptable levels of soluble salts will vary according to end-user applications. Compost producers must label or provide information for the intended end-use application and comply with user industry standards. The optimal ranges for growing media, that is, compost amended soil, is 0.5 to 4.5 mmhos/cm.

3. PFRP (Process to Further Reduce Pathogens) is a process standard requirement defined at 40 Code of Federal Regulations Part 530, Appendix B to Part 503 - Pathogen Treatment Processes, (B)(1).

4. Fecal coliform requirement is defined at 40 CFR Part 503, §503.32 (a)(3)(i).

5. Salmonella requirement is defined at 40 CFR Part 503, §503.32 (a)(3)(i).

6. Acceptable pH levels will vary according to end-user applications. Compost producers must label or provide information for the intended end-use application and comply with user industry standards.

7. EPA published "final rule" Alternate Pollutant Limits (APL) February 19, 1993. The APL regulated chemicals listed and limits shown are found in 40 CFR Part 503 - Standards for the Use or Disposal of Sewage Sludge, §503.13 Pollutant Limits, Table 3 of §503.13 - Pollutant Concentrations. APL limits refer both to sludge compost and to sludge compost product blends leaving the producer's site. These are pollutant concentration limits that apply to land-applied sewage sludge and sludge compost. It is believed these limits can be used for other composts, and research is underway by the Composting Council to substantiate the numbers for compost produced from source-separated and from mixed organic material recovered from municipal solid waste.

The concentration for each pollutant listed in bulk sewage sludge applied to agricultural land, forest, a public contact site, a reclamation site, a lawn, or a home garden and in sewage sludge sold or given away in a bag or similar enclosure for application to the land shall be equal to or less than the concentration for the pollutant in this table.

Compliance with USEPA limits must be accompanied with USEPA test methods shown in Table 1.

8. It is recommended in the letter from USDA dated May 20, 1993 to the Honorable Carol Browner, Administrator, USEPA, along with "Information in Support of Recommended Changes in the 503 Rule" that the following Pollutant Concentration limits be adopted:

Arsenic (As)	54 mg/kg dry wt.
Cadmium (Cd)	21 mg/kg dry wt.
Chromium (Cr)	delete (see note 9)
Molybdenum (Mo)	54 mg/kg dry wt.
Selenium (Se)	28 mg/kg dry wt.

9. The USDA has recommended to the USEPA that limits for sludge Cr be removed from the 503 rule. As reported by the W-170 Peer Review Committee, no experimental evidence has been reported that sludge Cr causes adverse effects to any component of the ecosystem.

10. The limit refers to content of glass shards and metal fragments that pose a human and animal safety hazard with unprotected exposure.

11. This limit refers to film plastic pieces that pose a health hazard to some animals if ingested.

12. PRS (Process to Reduce Sharps) is a Composting Council draft process standard requirement defined in Table 1, Note 31, intended to eliminate steel sewing needles and straight pins, and stainless steel hypodermic needles from compost, that can pose a puncture hazard when handled or ingested.

VITA

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