Maine Department of Environmental Protection

GUIDANCE FOR MUNICIPALITIES

REGULATION OF SEPTAGE AND SLUDGE LAND APPLICATION BY MUNICIPALITIES

SEPTEMBER 2002

State laws and regulations change periodically.
References in this document are current as of September 2002

This document is for guidance purposes only, and is not a substitute for reading and understanding the full text of State laws and regulations.

When developing any ordinance, a municipality should seek legal counsel.
The Maine Department of Environmental Protection cannot provide legal counsel to municipalities.

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INTRODUCTION

This guidance has been prepared pursuant to 38 MRSA §1304(17), which requires that the Commissioner of the Department of Environmental Protection *"shall develop guidance to municipalities regarding the regulation of septage and sludge land application by municipalities. The guidance must include information regarding site location restrictions, testing and enforcement actions that may be undertaken by a municipality and municipal roles and responsibilities under section 1310-U."*

This guidance does not cover all procedures the municipality must follow to enact an ordinance. For general guidance, municipalities should contact the Maine Municipal Association and the town attorney.

The terms "septage" and "sludge" are not interchangeable. Septage and sludge are regulated differently under Maine State law. Additionally, the U.S. Environmental Protection Agency has promulgated regulations relating to septage and sludge handling.

SOLID WASTE MANAGEMENT IN MAINE – REGULATION AND POLICY

The "Maine Hazardous Waste, Septage and Solid Waste Management Act" (38 MRSA §1301 et seq.) contains provisions related to the management and regulation of all types of waste facilities. The Act also includes a legislative declaration of policy concerning waste management. In part, that declaration states:

> *"The Legislature finds and declares it to be the policy of the State, consistent with its duty to protect the health, safety and welfare of its citizens, enhance and maintain the quality of the environment, conserve natural resources and prevent air, water and land pollution, to establish a coordinated statewide waste reduction, recycling and management program.*
>
> *The Legislature finds that it is in the best interests of the State to prefer waste management options with lower health and environmental risk and to ensure that such options are neither foreclosed nor limited by the State's commitment to disposal methods. The Legislature declares that it is in the public interest to aggressively promote waste reduction, reuse and recycling as the preferred methods of waste management."*

The "solid waste management hierarchy" is also codified in Maine law at 38 MRSA §2101 and states:

> *"It is the policy of the State to plan for and implement an integrated approach to solid waste management, which shall be based on the following order of priority:*
>
> *A. Reduction of waste generated at the source, including both amount and toxicity of the waste;*
> *B. Reuse of waste;*
> *C. Recycling of waste;*
> *D. Composting of biodegradable waste*
> *E. Waste processing which reduces the volume of waste needing land disposal, including incineration; and*
> *F. Land disposal of waste."*

The Department of Environmental Protection is responsible for the regulation of all types of solid waste handling facilities and activities, including the agronomic utilization of sludges and other residuals, and for septage management in Maine. The Department also provides technical assistance, information, education and outreach regarding solid waste management. Solid wastes such as municipal trash, ash, industrial process wastes, sludges and other residuals are managed in Maine in a variety of different ways as outlined in the solid waste hierarchy. State statute and Department rules establish standards and criteria that must be met for each management option that ensure protection of public health and the environment. The Department of Environmental Protection is specifically authorized by the Legislature to "*. . . adopt, amend and enforce rules as it deems necessary to govern waste management, including the location, establishment, construction and alteration of waste facilities as the facility affects the public health and welfare or the natural resources of the State. The rules shall be designed to minimize pollution of the State's air, land and surface and ground water resources, prevent the spread of disease or other health hazards, prevent contamination of drinking water supplies and protect public health and safety."*

Additional information relating to regulation of sludge land application in Maine is contained in Appendix III.

BACKGROUND

❑ WHAT IS SLUDGE?

Many municipalities, as well as industrial facilities such as food processors and paper mills, have wastewater collection systems. Wastewater flows from the collection system into a treatment plant. The function of a wastewater treatment plant is to accelerate the natural process of water purification.

As wastewater enters a treatment plant, it flows through a screen to remove rags, sticks, and other large objects that could plug the system or interfere with equipment. The screened wastewater passes through a grit chamber that is used to settle out sand and stones.

After screening and grit removal, the wastewater still contains organic and inorganic material, in the form of suspended solids. As flow is reduced in the system, some of the suspended solids will settle. The settled solids are referred to as *primary sludge*.

Wastewater from the primary stage flows to a secondary treatment process. Secondary treatment involves utilizing bacteria to break down and transform most of the organic matter to a microbial biomass. This biomass is settled out as *secondary sludge*.

In many treatment facilities, the primary and secondary sludges that are periodically removed from the system are combined and transported to a landfill, compost[1] facility, or land application site.

State law, 38 MRSA §1303-C(28-A), defines sludge as: "*non-hazardous[2] solid, semisolid or liquid waste generated from a municipal, commercial or industrial wastewater treatment plant, water supply treatment plant or wet process air pollution control facility or any other waste having similar characteristics and effect. The term does not include industrial discharges that are point sources subject to permits under the federal Clean Water Act, 33 United States Code, Section 1342 (1999).*" Sludges are a subset of special wastes[3], which, in turn, are a category of solid waste[4]. A site at which

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1 Department Regulations Chapter 400, section 1.DD defines compost as*: "a residual that has undergone the composting process*." Composting (Ch. 400 Sec 1.EE) is defined as "*the biological decomposition of organic residuals under predominantly aerobic conditions and controlled temperatures between 110 ° F and 150 ° F."*

2 Non-hazardous waste is solid waste, special waste or septage that is not regulated as a hazardous waste under Chapters 850 – 857 of the Department's rules.

3 Department Regulations Chapter 400, section 1.Mmm defines special waste as: "*any solid waste generated by sources other than household and typical commercial establishments that exists in such an unusual quantity or in such a chemical or physical state, or any combination thereof, that may disrupt or impair effective waste management or threaten the public health, human safety or the environment and requires special handling, transportation and disposal procedures. Special waste includes, but is not limited to . . .*
(3) Sludge and dewatered septage…"

4 38 MRSA, §1303-C(29) defines solid waste as: "*useless, unwanted or discarded solid material with insufficient liquid content to be free-flowing, including, but not limited to, rubbish, garbage, refuse-derived fuel, scrap materials, junk, refuse, inert fill material and landscape refuse, but does not include hazardous waste, biomedical waste, septage or agricultural wastes. The fact that a solid waste or constituent of the waste may have value or other use or may be sold or exchanged does not exclude it from this definition*."

sludge is land applied, stored, or composted is considered a solid waste facility, but not a solid waste *disposal* facility. Landfills and incinerators[5] where sludge is disposed are defined as solid waste disposal facilities.

Sludges that are regulated by the Department include sewage sludge, papermill sludge, and food-processing waste.

❑ WHAT IS SEPTAGE?

A septic system consists of a septic tank and a leachfield. Wastewater flows from the home to the septic tank, which treats wastewater by holding it in the tank long enough for solids and liquids to separate. Greases and oils float to the top of the tank, forming a layer of scum. Solids settle to the bottom of the tank forming a layer of sludge. The middle layer consists of partially clarified wastewater.

In a properly functioning system, layers of sludge and scum remain in the septic tank where natural bacteria break down the solids. The sludge and scum that cannot be broken down are retained in the tank until the tank is pumped. The layer of clarified liquid flows from the septic tank to the leachfield. The leachfield treats the wastewater by allowing it to slowly trickle from the pipes into a crushed-stone bed, and down through the soil. The stone and soil act as biological filters.

State law, 38 MRSA §1303-C(27), defines *septage* as: "*waste, refuse, effluent, sludge and any other materials from septic tanks, cesspools or any other similar facilities."* The Department regulates septage land application, and further defines septage, in state regulations *Chapter 420: Septage Management Rules*, as: "*a mixture of liquids and solids derived from residential sanitary wastewater, and includes sanitary wastewater from tanks connected to commercial and institutional establishments which have inputs similar to residential wastewater. Septage also includes wastes derived from portable toilets*." As noted above, septage is specifically excluded from the definition of solid waste. Therefore, septage storage and land application sites are not solid waste facilities.

It is important to note that septage, as considered under state regulations, does not include all wastewaters that enter a holding tank or septic system. *Some* of the facilities that produce wastewaters entering a holding tank or septic system that are *not* septage include: car washes, auto repair shops, funeral homes, airports, dry cleaners, photo processors, department stores discharging floor wax, metal fabricators, printers, and lawn care companies. These wastewaters may require a waste discharge license under 38 MRSA Chapter 3, Section 413, and are *not* covered under this guidance document.

The septage pumped from a septic tank is typically discharged to a wastewater treatment facility, discharged to a septage processing facility[6], or land applied. Septage that is land applied is regulated under Chapter 420, *Septage Management Rules*. Solids from the wastewater treatment facility and

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5 Sewage sludge is not incinerated in Maine. Some papermill sludges are used as boiler fuel.

6 Septage processing facilities that currently exist in Maine receive liquid septage, and de-water the septage for further treatment such as composting or lime-stabilization.

dewatered septage from a septage-processing facility are considered sludge, and are regulated as sewage sludge (See Appendix I). The liquid fraction is considered a wastewater (*not* septage), and is regulated under a waste discharge license.

❑ SLUDGE AND SEPTAGE LAND APPLICATION IN MAINE

Land application is the spraying or spreading of residuals[7] on the ground surface or incorporating the residuals below the ground surface. Sludge generators often choose land application because it is a lower cost option than landfilling or composting, and because the sludge is re-used rather than disposed. Sewage sludge, secondary papermill sludge, and certain food-processing sludges are applied to the land to provide crop nutrients. Primary papermill sludges and composted sludges are land applied to provide organic matter. Other papermill sludges are used as agricultural liming agents (Please refer to Appendix III for additional details regarding use of sludge).

Based on annual reports submitted to the Department in 2000, approximately 46% of the sewage sludge generated at Maine wastewater treatment facilities was composted, 27% was land applied, 23% was landfilled, 3% was stockpiled for future use, and 1% was shipped out-of-state. Annual reports received from papermills indicate that approximately 77% of the papermill sludge was landfilled, 14% was designated as "other use" (mixed with topsoil, used as landfill cover, etc.), 5% was land applied, 3% was composted, and 1% was stockpiled for future use.

Septage is land applied for much the same reason as is sludge - it is a lower cost alternative to composting or discharge to a wastewater treatment facility. As with sewage sludge, septage does provide crop nutrients.

In 2000, approximately 11 million gallons of septage was land applied in Maine, approximately nine million gallons was de-watered and composted, approximately 20 million gallons of septage was discharged to wastewater treatment facilities.

❑ DEPARTMENT LICENSING OF SLUDGE LAND APPLICATION

Before sludge can be land applied in Maine, the Department must license the use pursuant to Department regulations Chapter 419, *Agronomic Utilization of Residuals.* Under the standards of this chapter, the Department must first determine if the sludge qualifies for land application, based on the contaminant concentrations in the sludge and the proposed uses of the material. If the sludge does qualify for agronomic use, the Department will issue a Program License. In the Program License, the Department assesses the horticultural benefit of utilization, the potential risks to public health and the environment posed by the use, and the appropriate siting and operational standards that must be followed to protect against the identified risks. Risks addressed by the Department in a license are detailed in Appendix III.

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[7] Department Regulations Chapter 400, section 1.Ss defines **residual** as: "*solid waste generated from municipal, commercial or industrial facilities that may be suitable for agronomic utilization*."

The Department determines in the Program License whether or not generators must obtain site-specific licenses from the Department to utilize the residual. The Department requires a site-specific license when it determines that safe use of the residual depends on certain site characteristics, such as: depth-to-bedrock, depth-to-water table, slope, distance to waterbodies and wells, and/or soil types. The Department cannot approve sludge land application or storage until it concludes that:

"1. The proposed project will not pollute any water of the State, contaminate ambient air, constitute a hazard to health or welfare, nor create a nuisance;

2. The applicant has the financial capacity and technical ability to operate the project in a manner consistent with State environmental standards;

3. The applicant has made adequate provisions for traffic movement of all types into, out of and within the site;

4. The proposed facility fits harmoniously into the existing natural environment and will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the municipality or in neighboring municipalities;

5. The proposed facility will be on soil types suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment, nor inhibit the natural transfer of soil;

6. The proposed facility will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur;

7. The applicant has made adequate provisions for utilities including water supplies, sewerage facilities, solid waste disposal and roadways required for the project, and the proposed facility will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services;

8. The activity will not unreasonably cause or increase the flooding of the area or adjacent properties nor create an unreasonable flood hazard to any structure."

In many instances, the Department will include a series of license conditions to ensure that the statutory criteria will be met.

❑ DEPARTMENT LICENSING OF SEPTAGE LAND APPLICATION

The Department must license all septage land application sites pursuant to Department Regulations Chapter 420, *Septage Management Rules.* Septage land application sites are separated into two categories: utilization and non-utilization.

Utilization sites are sites at which only screened and treated septage can be land applied. Screening involves passing all septage through a device that will screen out most of the larger, foreign materials, such as rags, plastics, stones, etc. Subsequent treatment is specifically aimed at reducing pathogens and odors. To treat septage for pathogen reduction, septage must be thoroughly mixed with lime. The pH of the resultant mix must be at least 12, and must remain at 12 for one-half hour. Additionally, the mix must be at least pH 12 at the time of spreading; this serves to provide a level of odor control during spreading. Non-utilization sites are sites at which septage can be land applied without prior screening or treatment.

The requirements for suitable soil types on which septage can be applied, the depth-to-watertable, depth-to-bedrock, and loading rates are the same for utilization and non-utilization sites. However, since septage applied to non-utilization sites is not treated to reduce pathogens or odors, these sites must meet increased setback requirements, and have greater controls over public access than do utilization sites. Additionally, crops at a non-utilization site must be harvested and disposed at a licensed solid waste facility. Crops from a utilization site can be used for livestock feed or mulch.

Since septage land application sites are not considered "solid waste facilities", the statutory requirements for licensing are fewer than those for sludge land application sites. The Department cannot approve a septage land application site until it concludes in a site-specific license that:

"*1. The facility will not contaminate waters of the state, and not constitute a hazard to health or welfare;*

2. The facility will not contaminate the ambient air;

3. The facility will not create a nuisance; and

4. The applicant has the financial capacity and technical ability to develop the project in a manner consistent with state environmental standards."

However, as with sludge licenses, the Department will include a series of license conditions to ensure that the statutory criteria will be met.

SLUDGE LAND APPLICATION: REGULATION BY MUNICIPALITIES

❑ MUNICIPAL ROLES AND RESPONSIBILITIES UNDER STATE LAW

38 MRSA §1305 states that "*[e]ach municipality shall provide solid waste disposal services for domestic and commercial solid waste generated within the municipality and may provide these services for industrial wastes and sewage treatment plant sludge."* A municipality is not required by State law to provide utilization, storage, or disposal capacity for sludge generated by industry in their municipality. Likewise, municipalities are not required to adopt ordinances that regulate the storage or land application of sludge. However, if a municipality chooses to adopt a local ordinance regulating land application of sludge, that ordinance is subject to 38 MRSA §1310-U, which states:

> *"Under the municipal home rule authority granted by the Constitution of Maine, Article VIII, Part Second and Title 30-A, section 3001, municipalities, except as provided in this section [§1310-U], may enact ordinances with respect to solid waste facilities that contain standards the municipality finds reasonable, including, without limitation, conformance with federal and state solid waste rules; fire safety; traffic safety; levels of noise heard outside the facility; distance from existing residential, commercial or institutional uses; ground water protection; surface water protection; erosion and sedimentation control; and compatibility of the solid waste facility with local zoning and land use controls, provided that the standards are not more strict than those contained in this chapter and in chapter 3, subchapter I, articles 5-A and 6 and the rules adopted under these articles."*
>
> *"Municipal ordinances must use definitions consistent with those adopted by the board* [of Environmental Protection]."
>
> *"A municipality adopting an ordinance under this section [§1310-U] shall forward a copy of the ordinance to the commissioner [of the Department of Environmental Protection] within 30 days of its adoption."*

In summary, if a municipality chooses to adopt an ordinance regulating the storage, processing, or land application of sludge, the ordinance must:

- not be more stringent than the solid waste rules (see Appendix I for a summary of the applicability of various solid waste rule chapters) and solid waste statutes (38 MRSA §1301 *et seq.*);
- not be more stringent than Maine's Natural Resources Protection Act (38 MRSA §§ 480-A to 480-Z.) and the Site Location of Development Law (38 MRSA §§ 481 to 490) and rules adopted pursuant to those statutes;
- use definitions consistent with the definitions in the solid waste rules and solid waste statutes; and

- within 30 days of its adoption, be forwarded to:

  Commissioner
  Department of Environmental Protection
  Residuals Utilization Unit
  17 SHS
  Augusta, ME 04333-0017

In addition, 17 MRSA §2805(4) requires that, "*a municipality must provide the Commissioner of Agriculture, Food and Rural Resources with a copy of any proposed ordinance that impacts farm operations. The clerk of the municipality or a municipal official designated by the clerk shall submit a copy of the proposed ordinance to the commissioner at least 90 days prior to the meeting of the legislative body or public hearing at which adoption of the ordinance will be considered. The commissioner shall review the proposed ordinance and advise the municipality if the proposed ordinance would restrict or prohibit the use of best management practices. This subsection does not affect municipal authority to enact ordinances."* Draft ordinances should be sent to:

Commissioner
Department of Agriculture, Food and Rural Resources
28 SHS
Augusta, ME 04333-0028

- MUNICIPAL SITE LOCATION RESTRICTIONS

The municipality may adopt siting standards that, in the municipality's opinion, are "*reasonable, including, without limitation, conformance with federal and state solid waste rules; fire safety; traffic safety; levels of noise heard outside the facility; distance from existing residential, commercial or institutional uses; ground water protection; surface water protection; erosion and sedimentation control; and compatibility of the solid waste facility with local zoning and land use controls, provided that the standards are not more strict than those contained in"* the solid waste rules and statutes.

Section 1310-U allows a municipality to enact an ordinance that regulates any aspect of a solid waste facility, as long as the ordinance is not more stringent than state laws and rules that regulate solid waste facilities. At the state level, solid waste facilities are governed by the Maine Hazardous Waste, Septage and Solid Waste Management Act which can be found at 38 MRSA §1301 *et seq.* Solid waste facilities are also governed by the rules promulgated under §1301 *et seq.* These rules are found in Department Regulations Chapters 400-403, 405, 409, 418 and 419, which are collectively referred to as the *Solid Waste Management Regulations*. Specifically, the State's siting standards for land application of sludge are contained in Department Regulations, Chapter 419, section 3. The siting standards for storage of sludge prior to use are contained in Chapter 419, section 10. The siting standards for sludge processing facilities are contained in Chapter 409, section 2.A, and in some cases also section 9.B. Specific siting requirements vary depending on the characteristics of the sludge.

Although §1310-U requires that municipal ordinances be no more stringent than the statute or Department rules, ***this does not preclude the municipality from applying ordinance requirements differently than the Department applies its rules***, where the state regulatory language allows differing results. Obviously, the municipality would have to provide justification, based on the facts in the record, for such licensing decisions.

Many municipalities have cited 30-A MRSA §4356 as providing authority to impose a temporary moratorium on spreading or storage of sludge in that municipality. Moratoria must be supported by specific facts peculiar to the municipality and are often the subject of litigation. Your legal counsel must evaluate each potential moratorium on a case-by-case basis.

In accordance with 38 MRSA §1310-U, a municipality may not explicitly or implicitly enact a permanent ban on spreading or storage of sludge or residuals because that would be more stringent than the state's solid waste rules and statutes.

❑ MUNICIPAL TESTING

Chapter 419, Section13.B (3) provides that: "*a municipality may petition the Commissioner [of the Department of Environmental Protection] to review a generating facility's testing protocol for sludge. The Commissioner will respond to the municipality, in writing, within 10 days of receipt of a written petition. The Commissioner may order the generator to conduct an additional waste characterization test on their sludge at the generator's expense. The generator must provide a copy of the additional test to the municipality within 30 days of receipt*". Beyond that, a municipality would need to adopt a local ordinance to allow a local official to obtain samples relating to sludge utilization or storage activities, either at the generating facility or at the utilization or storage sites. The ordinance, however, could not impose a sampling program more stringent than that required by State solid waste laws.

❑ MUNICIPAL ENFORCEMENT ACTIONS

Title 30-A, §4452 allows for enforcement of land use laws and ordinances, as follows:

"1. Enforcement. A municipal official, such as a municipal code enforcement officer, local plumbing inspector or building inspector, who is designated by ordinance or law with the responsibility to enforce a particular law or ordinance set forth in subsection 5, 6 or 7, may:

A. Enter any property at reasonable hours or enter any building with the consent of the owner, occupant or agent to inspect the property or building for compliance with the laws or ordinances set forth in subsection 5. A municipal official's entry onto property under this paragraph is not a trespass; and

B. Issue a summons to any person who violates a law or ordinance, which the official is authorized to enforce; and

C. When specifically authorized by the municipal officers, represent the municipality in District Court in the prosecution of alleged violations of ordinances or laws, which the official is authorized to enforce."

§4452(5), (6), and (7), referenced above, pertain to: enforcement of land use laws and ordinances or rules administered and enforced primarily at the local level; enforcement of septage and sludge permits issued by the state (see below); and, natural resource protection laws.

Title 38 §1305(8) also provides that *"a municipality, after notifying the department, may enforce the terms and conditions of a septage land disposal or storage site permit or a sludge land application or storage site permit issued by the department*." The municipality has this authority whether or not it adopts a local ordinance.

❑ MUNICIPAL INPUT ON DEPARTMENT SLUDGE SITE LICENSE CONDITIONS

In addition to the above information specifically relating to site location restrictions, testing, and enforcement, 38 MRSA, §1305(9) also provides for coordination between the municipality and the Department regarding sludge utilization permit applications, as cited below:

"Coordination between the department and a municipality concerning applications and modifications in the terms or conditions of a permit or license for a sludge land application site or storage facility is governed by this subsection.

A. Within 14 working days of its receipt of a complete application for a sludge land application site or storage facility, the department shall notify the municipal officers or their designees from the municipality in which the site or facility would be located of the application and the name and address of the applicant. The department shall provide the municipal officers with copies of all test results performed on the sludge material that is proposed to be spread in that municipality. Prior to approving an application for a sludge land application site or storage facility, the department shall consult with the municipal officers or their designees in the municipality in which the site or facility is proposed and provide them with an opportunity to suggest conditions, including additional setbacks, to be imposed on a permit or license. If the department does not impose conditions on a permit or license that have been suggested in writing by the municipal officers, the department shall provide a written explanation to the municipal officers.

B. The department shall consult with the municipal officers within 10 days of receiving a request by the sludge generator to change the terms or conditions of a permit or license. The municipality may petition the commissioner to review a generating facility's testing protocol for sludge. The commissioner shall respond to the municipality in writing within 10 days of the municipality's petition. The commissioner may order the applicant to conduct an additional test at the applicant's cost. A copy of the additional test results must be provided to the municipal officers."

SEPTAGE LAND APPLICATION: REGULATION BY MUNICIPALITIES

❑ MUNICIPAL ROLES AND RESPONSIBILITIES UNDER STATE LAW

38 MRSA §1305(6) states that "*[e]ach municipality shall provide for the disposal of all refuse, effluent, sludge and any other materials from all septic tanks and cesspools located within the municipality. In addition, any person may provide a site for disposal of septage. In addition to making application to the Department of Environmental Protection for approval of any site, that person shall have written approval for the site location from the municipality in which it is located, unless the site is located in a Resource Protection District under the jurisdiction of the Maine Land Use Regulation Commission. A municipality may determine whether approval of the site must be obtained first from the department or the municipality. The municipal officers shall approve, after hearing, any such private site if they find that the site complies with municipal ordinances and with local zoning and land use controls. In the absence of applicable municipal ordinances and local zoning and land use controls, the municipality shall base its approval of the site on compliance with the siting and design standards in the department's rules relating to septage management. For purposes of this subsection, "municipality" means a city, town or plantation.*"

38 MRSA, §1310-U relates to municipal enactment of ordinances with respect to solid waste facilities. Since septage is expressly excluded from the definition of solid waste (see 38 MRSA, §1303-C(29)), 38 MRSA, §1310-U does not apply to septage or septage land application or storage sites.

❑ MUNICIPAL SITE LOCATION RESTRICTIONS

38 MRSA §1305(6), quoted above, provides that, if a municipality does not have any ordinances or land use controls, and the municipality is presented with an application for approval of a septage land application site, the municipality is required to apply the siting and design standards contained in Department regulations 06-096 CMR, Chapter 420, *Septage Management Rules*. Siting and design standards for land application are found in Chapter 420, sections 4 and 5. Siting and design standards for storage are found in sections 11 and 12. This does not preclude the municipality from applying the regulatory requirements differently than the Department applies its rules, where the regulatory language allows differing results. Obviously, the municipality would have to provide justification, based on the facts in the record, for such licensing decisions.

There is no specific statutory pre-emption of local ordinances that are more stringent than state standards. However, there may be an implied pre-emption under the Maine Constitution because septage is comprehensively regulated by the state.

❑ MUNICIPAL TESTING

A municipality must adopt a local ordinance to allow a local official to obtain samples relating to septage land application or storage activities, either at the site of generation or at the spreading or storage sites.

❑ MUNICIPAL ENFORCEMENT ACTIONS

State law provides that, even without a local ordinance, municipalities have the following enforcement authority at septage sites pursuant to:

38 MRSA §1306(2). *"On-site disposal of domestic septage; penalty. A homeowner may arrange for a septage pumper to dispose of septage from a residence on property of the owner of the residence at the request of the property owner, a maximum of 2 times a year, provided that the septage is placed at least 300 feet from property boundaries, fresh surface waters, tidal waters, water supplies, streets, highways and permanently or seasonally inhabited residential structures. Any homeowner or septage pumper who violates the provisions of this subsection shall be subject to a civil penalty, payable to the municipality, of not more than $1,000 for each day of violation*."

38 MRSA §1305(7). *"On-site disposal of domestic septage; enforcement. Municipalities shall enforce the provisions of section 1306, subsection 2. Municipalities may recover all costs of enforcement, including attorneys' fees, from a septage pumper who violates the provisions of that subsection*."

38 MRSA §1305(8). *"Septage and sludge permits; municipal enforcement. Pursuant to Title 30-A, section 4452, subsection 6, a municipality, after notifying the department, may enforce the terms and conditions of a septage land disposal or storage site permit or a sludge land application or storage site permit issued by the department under this subchapter*."

APPENDIX I

SLUDGE AND SEPTAGE REGULATION, INFORMATION SOURCES

You can find guidance manuals, license application forms, loading rate calculations, and links to other useful websites at http://www.state.me.us/dep/rwm/residuals.htm

Sludge and Septage rules are available at www.maine.gov/sos/cec/rcn/apa/06/chaps06.htm

The applicable rules that you may want to download are:

- Chapter 2 - Rules Relating to the Processing of Applications. This Chapter has the general rules that apply to all licenses the Department processes.
- Chapter 400 - General Standards. This Chapter has the general standards that pertain to all solid waste facilities. This Chapter contains definitions, generic descriptions of license types and license processing, and general licensing standards. Chapters 409 and 419 often reference these standards.
- Chapter 405 - Waste Characterization. Section 6.D of this rule has the analytical requirements for wastes that are agronomically used, or processed.
- Chapter 409 - Processing Facilities. This Chapter has the siting, design, and operational standards for compost and other processing facilities, along with associated storage. (The standards for where the resultant products are used and stored are contained in Chapter 419).
- Chapter 418 - Beneficial Use. This Chapter contains the "Appendix A" screening standards for pollutants (other than metals) in residuals. This appendix is referenced in Chapter 419. This Chapter also contains the requirements for beneficial use projects other than for agricultural purposes.
- Chapter 419 - Agronomic Utilization of Residuals. This rule has the siting and operational standards for people who want to use a residual as a soil amendment, mulch, fertilizer, etc. Compost, sewage sludge, woodash, lime-mud, fishwaste, food processing sludges, short-paper fiber, etc are regulated under this Chapter. The Chapter also includes the siting, design and operational standards for storage of these residuals.
- Chapter 420 – Septage Management Rules. This rule has siting and operational standards for people who want to use septage as a nitrogen fertilizer, or people that want to dispose of septage on land. The Chapter also includes the siting, design and operational standards for septage storage.

APPENDIX II

CONTACT INFORMATION

State of Maine, Department of Environmental Protection

Augusta
17 State House Station
Augusta, Maine 04333-0017
207.287.7688
Toll free 800.452.1942
TTY 800.492.0859

Bangor
106 Hogan Road
Bangor, Maine 04401
207.941.4570
Toll free 888.769.1137
Fax: 207.941.4584

Portland
312 Canco Road
Portland, Maine 04103
207.822.6300
Toll free 888.769.1036
Fax: 207.822.6303

Presque Isle
1235 Central Drive, Skyway Park
Presque Isle, Maine 04769-2094
207.764.0477
Toll free 888.769.1053
Fax: 207.764.1507

United States Environmental Protection Agency

The EPA can be contacted through their website www.epa.gov EPA Region I (which encompasses the New England states) can be contacted at:

U.S. EPA Region I
JFK Federal Building
One Congress Street
Boston MA 02203-2211

Maine Municipal Association

MMA is "a voluntary membership organization of the State's cities, towns, plantations and organized townships to provide a unified voice for Maine's municipalities to promote and strengthen local government." MMA can be contacted through their website, www.memun.org , or at:

Maine Municipal Association
60 Community Drive
Augusta, ME 04330

Phone: 800-452-8786 or 207-623-8428

APPENDIX III

REGULATING AGRICULTURAL UTILIZATION OF SOLID WASTES IN MAINE

David Wright
Residuals Utilization Unit
Division of Solid Waste Management
Bureau of Remediation and Waste Management
Maine Department of Environmental Protection

Revision: March 22, 2001

Introduction: For decades, Maine industries have recycled organic solid wastes into fertilizers and soil amendments. Today, Maine is seen as a leader in this field (Goldstein, 2000). The Maine Department of Environmental Protection (the DEP) allows these solid wastes to be recycled, if the DEP determines that the use will not pollute any water of the State, contaminate ambient air, constitute a hazard to health or welfare, or create a nuisance (38 MRSA 1310-N). "Agronomic utilization" or "utilization" means the land application of residuals in a controlled manner in order to supply crop nutrients, improve soil conditions, or provide some other horticultural benefit.[8] "Residuals" are solid wastes generated from municipal, commercial or industrial facilities that have undergone scrutiny by the DEP to make sure they are suitable for agronomic utilization. Residuals that have been approved for use include food, fiber, vegetable and fish processing wastes; dredge materials; sewage sludge; short paper fiber; dewatered septage; and ash from wood, sludge or other fuels.

State Regulations: The Department has been overseeing utilization activities since the late 1970s. The DEP currently licenses agronomic utilization activities under Chapter 419, "Agronomic Utilization of Residuals" (effective December 19, 1999).[9] Under this Chapter, a residual generator must first demonstrate to the DEP that land application of their residual would benefit crops or soil. Then, based on the contaminant concentrations in the residual and proposed uses, the DEP assesses the risk to public health and the environment. Finally, the DEP determines how the residual must be handled at the utilization site to prevent adverse impacts. These decisions are made through a licensing process, in which the generator of the residual notifies the public and then submits a proposal. The DEP reviews the information and all the comments submitted on the application and then issues a written license that either approves or denies the proposed project. Any license issued by the Department specifies the circumstances under which the residual may be used. The degree to which a residual is regulated varies with the potential human or environmental threat posed by the material. Generators must obtain site specific licenses from the DEP to utilize residuals that require special handling or when protection of public health and the environment depends on specific site characteristics, such as depth to bedrock, depth to water table, slope, and soil type. Utilization of benign residuals, such as clean woodash, is afforded through a blanket approval process.

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[8] Beneficial use, in addition to agronomic utilization, includes the use of solid waste as a substitute for a raw product in manufacturing, as fill, as a building material, or as a fuel. This summary does not cover these other types of beneficial use.
[9] Chapter 419 replaced Chapter 567, Rules for Application of Sludge and Residuals (effect April 21, 1985). Chapter 567 replaced Chapters 430, Regulations for Municipal Treatment Plant Sludge Disposal on Land and Chapters 565-566, Rules for Municipal Sludge Utilization on Land (effective September 1980). The DEP began licensing utilization in 1978.

Benefits: The potential benefits of a given solid waste will vary. Residuals such as sewage sludge and fish by-products are rich in nutrients, and are ideal replacements for mineral fertilizers. Farmers can substitute other residuals for agricultural lime, such as wood ash and lime-mud, to adjust soil pH for optimal plant growth. Other residuals, such as primary paper mill sludge or wood wastes, can enhance a soil's moisture holding capacity and structure. By using these products, farmers and foresters can increase the health of their crops (e.g. Clapp, 1993), which may in turn reduce the need to apply pesticides or herbicides.

Pathogens: Sewage sludge, dewatered septage, and similar residuals contain pathogens. Pathogens are microorganisms that can cause disease in humans, including bacteria, viruses, protozoa and helminth ova. The DEP has not established risk based standards for pathogens due to their high variety in sewage sludge, the cost and uncertainty of identifying and quantifying viable pathogens, and the lack of risk assessment protocols for these organisms (Farrell 1992; EPA, 1999). Rather, the DEP uses technology-based standards for treatment of pathogens; before being used, these residuals must be treated in a certain way to kill pathogens.[10]

At a minimum, the DEP requires that residuals containing pathogens be treated by one of six processes which will reduce pathogen concentrations by at least 90%. Most Maine treatment plants achieve this so-called "Class B Pathogen Reduction Standard" through lime stabilization, in which enough lime is mixed with the sludge to raise the pH to 12 after two hours of contact with the lime. Once a residual has undergone a Class B process, it may be land applied at a licensed site. After being land applied, pathogenic organism are reduced to background concentrations by environmental factors such as ultraviolet radiation from the sun, competing soil microorganisms, drying out, temperature changes, soil pH, and organic matter (Farrell, 1992). In order to protect public health while this environmental destruction of pathogens takes place, Chapter 419 mandates waiting periods before a farmer can harvest crops or graze livestock on the land where Class B-treated residuals are utilized. The DEP requires that a generator obtain a utilization permit prior to land application of a residual that is treated to a Class B standard, to ensure that the sites are appropriately managed.

[10] An epidemiological study conducted in Ohio (Hamparian, 1985) suggests that this approach (using process standards, rather than establishing pathogen concentration standards) to mitigate pathogenic risks is protective of human health. In this study, the Ohio University Medical School found that over the course of 3 years the incidence of disease was the same for 100 farm families that used a class B treated sewage sludge, and 100 farms where sludge was not applied.

Table 1: Waiting Periods After Using Pathogen-Containing Residuals treated to a Class B Pathogen Reduction Standard

Waiting period (in months)	How the Residual is Land Applied	Type of crop	Location of harvested parts
14	top-dressing to land surface	food	above soil
20	incorporated after residual is on the land surface for 4 months or more	food	in soil
38	incorporated within 4 months of application	food	in soil
1	surface or incorporated	feed/fiber	n/a
1	surface or incorporated	grazing	n/a
12	surface or incorporated	Turf	n/a
38	surface or incorporated	topsoil	n/a

Residuals containing pathogens, such as sewage sludge, can also be treated more fully, to a so-called "Class A Pathogen Reduction Standard", using one of ten different processes. In a Class A process, pathogen concentration are reduced to natural background soil concentrations (Rubin, 1994). In the State of Maine, this is usually done through composting the residual.[11] Heat drying is another common Class A process that generators in other states use to treat sewage sludge before it is marketed in Maine. The DEP generally licenses compost use under a blanket "Program" license, rather than requiring site-specific permits. This is because harvesting restrictions are not required for compost products as they are for Class B residuals, composting reduces odorous emissions, and nutrients are generally less available in composted materials as compared to unprocessed materials. The DEP requires compost facilities to monitor and report compost quality and the volume of compost sold in the State. The facility operators must also record to whom they sell the compost, and its intended use. DEP inspections ensure that the information is accurate.

Nutrient Imbalances: Groundwater contamination is a potential problem at utilization sites if nitrogenous residuals are mishandled. Nitrogen contamination in groundwater, reduced to nitrite by bacteria and ingested by humans, interferes with the blood's ability to transport oxygen to cells, particularly in infants (Hicks, 1993). DEP regulations protect groundwater by requiring that nitrogenous residuals be applied at an agronomic rate. An agronomic rate is the amount of residual necessary to supply the nitrogen needs of the crop for optimal growth, without oversupplying nutrients. If excess nitrogen is supplied, it will dissolve in rainwater and leach into groundwater. DEP also requires that the residual be applied during the growing season. In this way, the crop takes up the nitrogen before it passes through the root zone to groundwater. Further, the DEP prohibits utilization of nitrogenous residuals on excessively drained soil or on shallow soil. Finally, as an added layer of protection, nitrogenous residuals can not be applied within 300 feet of a water supply well.

[11] Chapter 400 defines Composting as " the biological decomposition of organic residuals under predominantly aerobic conditions and controlled temperatures between 110° and 150° F." A compost process provides optimal conditions for natural bacteria and other microorganisms to break down an organic material. During this process, heat will be produced. By sustaining temperatures of 55 ◦C for 3 days, the pathogen kill meets the Class A standard

When utilizing phosphorus-containing residuals, the DEP is concerned with potential degradation of surface water quality. Phosphorus from the residual tends to bind with soil particles on the site. However, if soils erode from the site into nearby surface waters, water quality can be adversely impacted (MEDEP, 1992). Phosphorus is the limiting nutrient in most surface waters (Krebs, 1978). When soil washes into a surface water body, the phosphorus acts as a fertilizer and greatly increases algae plant growth in the waterbody, giving the waterbody an unsightly green tinge. This cuts down on the sunlight that reaches the bottom, and the plants die and sink. The decaying process uses up the oxygen at the bottom of the lake, so that there is not enough oxygen for cold-water fish populations. To prevent this eutrophication process, in sensitive watersheds the DEP requires that no more phosphorus be added to a utilization site than will be removed when the crop is harvested. In this way, phosphorus concentrations in soil cannot increase above background concentrations. In less sensitive watersheds, DEP requires that buffers between the utilization area and drainage features be established and maintained. While soil phosphorus concentrations may increase in these areas, the buffers filter out soil and phosphorus to help protect surface waters. Additionally, the DEP prohibits utilization of high phosphorus residuals on poorly drained soils and on steeply sloped land, again to help prevent soil with high phosphorus concentrations from running into a waterbody. Finally, the DEP requires that landappliers monitor soil phosphorus content, and cease use of an area if the phosphorus concentration exceeds reasonable levels.

The DEP is also concerned that repeat utilization at sites will ultimately damage soil health, and thus crop productivity. Therefore, the DEP requires annual soil tests at licensed utilization sites to monitor the balance of essential minerals, such as potassium, magnesium, calcium and phosphorus. These tests also ensure that the soil is optimally balanced for soil pH, organic matter content, and has the optimal ability to retain essential nutrients, as measured by the soil's Cation Exchange Capacity (CEC). The optimal target levels in soil for these parameters will vary depending on the crops being grown (Hoskins, undated). Residual utilization increases the optimal levels of one or more of these parameters in soil, and thus increases crop growth. However, residuals may over-saturate the CEC with a given cation, thus displacing other essential cations that leach from the system. When cation imbalances are detected, the DEP requires the generator to restore the nutrient balance through the addition of other nutrients. Generators of residuals are beginning to blend residuals to provide nutrients balanced to the crop's need. In this way, residual generators leave the soil at utilization sites healthier than it was when they began to use the site.

Heavy Metals: Some residuals, such as woodash or sewage sludge, may contain heavy metals which, in excessive amounts, could be detrimental to human health, crop productivity, or wildlife. The DEP requires that generators monitor metal levels in residuals and prohibits land application of residuals that exceed State standards. Historically, some residuals, such as sewage sludge from industrial areas, had extremely high heavy metal concentrations. However, in 1982, the Clean Water Act mandated that industrial dischargers pre-treat their effluent to remove contaminants that accumulate in a treatment plant's sludge, so that today most sewage sludge has metal levels that are well within acceptable limits. Woodash generators can change the fuel mix to meet DEP standards. Other residual generators can manipulate process controls or change chemical inputs in order to meet residual concentration standards.

In addition to residual concentration standards, the DEP has established limits on the amount of heavy metals that can be put on a site in any year, and over the lifetime of site use. When the level of metals in a residual exceeds conservative (low) screening standards, the generator of the material is required to calculate how much metal will be loaded onto the site, and confirm the calculations with actual soil tests. The rules establish maximum lifetime loading rates in order to make sure that the site remains suitable for any future use, and does not adversely impact abutting properties. In the past 30 years of utilization in

Maine,Cation saturation of the CEC or nutrient buildup in soil has curtailed utilization activities long before the site reaches soil metal limits: utilization of residuals has never been suspended due to high metal loading. In fact, soil data from the most heavily utilized sites in Maine (Houtman, 1995) shows that soil and plant metal concentrations are still within typical agricultural soil (Pollock, 1997; Shacklette, 1984) and plant (ERG, 1992) background concentrations, and do not even approach risk based standards (ERG, 1992). In addition to residual quality standards, residuals with high metal concentrations can only be used on sites where soil types, buffers, and low slope will protect surface and ground water from heavy metal impacts.

The DEP established metal standards based upon a critical review of a 1992 risk assessment conducted for EPA as they developed Federal sewage sludge regulations. EPA evaluated fourteen (14) pathways of exposure including direct ingestion of sewage sludge by children, drinking water impacts, contamination by airborne dust, ingestion of plants or animals from sludge amendment sites, phytotoxic effects and impacts to animals (ERG, 1992). The EPA risk assessment is specific to the sewage sludge matrix. Therefore, the results of the EPA risk assessment on sewage sludge can not be directly applied to other media, such as woodash. DEP also assessed new toxicological information from hazardous waste site clean-ups. The DEP developed risk-based standards designed to protect human health and wildlife from adverse impacts while the site was being utilized, and after utilization was concluded. Then, the standards were further reduced when existing technologies made lower metals concentrations feasible in the residual. Attachment A contains heavy metal standards for sewage sludge & other residuals.

Dioxin: Dioxin and furans are a class of 205 halogenated aromatic hydrocarbons, which can have detrimental impacts on human health at very low concentrations (EPA, 1994). Several congeners of dioxin and furans have been detected in sludge from sewage treatment plants, and in some residuals from tanneries, textile mills, and paper mills (Mower, 2000). Dioxin forms when organic substances are heated in the presence of chlorine. Sources of environmental dioxin are from the use of herbicides containing 2,4,5-T; wood preservatives; incineration of bio-medical, hazardous and solid wastes; wood combustion in the presence of chlorine; transformer fires; and leaded gasoline use (ASTDR, 1989). Dioxin in sewage sludge may come from industrial dischargers to the system, or from airborne dioxin settling onto land areas, and then being washed into storm sewers, and then into the treatment plant. The dioxin is not formed in the sewage treatment process.

The DEP requires that, prior to utilization, generators test sludge and residuals with the potential for containing dioxin. Dioxin and furan concentrations are expressed in dioxin equivalents, which is the summation of the dioxins' proportional toxicity to the most potent dioxin congener, 2,3,7,8 tetrachlorodibenzo-*p*-dioxin (2378 TCDD). The DEP prohibits the use of residuals that contain greater than 250 ppt dioxin equivalents[12]. The DEP requires that generators that spread residuals containing greater than 27 ppt dioxin equivalents measure the resultant concentration in soil. If soil concentrations exceed 27 ppt dioxin equivalents, the generator is required to put a restriction in the property deed that prohibits growing crops or raising animals for human consumption at the site. Additionally, generators must locate and manage sites to minimize erosion of soil into waterways when utilizing residuals with greater than 27

[12] PPT means parts- per- trillion. One ppt is equal to .0000000001%. The 27 ppt 2378 TCDD equivalence standard is based on the amount of dioxin in soil resulting in an excess Incremental Lifetime Cancer Risk (ILCR) of 10^{-6},. The ILCR was calculated from a conservative Cancer Potency Factor of 1.56 X 10^{5} $(mg/kg\text{-}day)^{-1}$ and a scenario of a farmer consuming milk from dairy cattle consuming hay and corn from sludge amended fields. The 250 ppt 2378 TCDD equivalence standard is based on sludge concentrations that would increase soil concentrations up to 27 ppt. (Sproul, 1986 and MWCA, 1986)

ppt dioxin equivalents. There are no additional restrictions for utilization of residuals containing 27 ppt dioxin equivalents or less.

Currently all Maine sewage treatment plants landfill sludge that routinely has concentrations above 27 ppt 2378 TCDD equivalents. Paper mills historically had sludges that exceeded these standards. However, with the phasing out of chlorine use in the papermaking process, the concentration of dioxin has dropped below 27 ppt.

Other Hazardous Substances: Other organic hazardous substances have been detected from time to time in residuals generated in Maine. These hazardous substances are often divided into general categories based on the methods used to analyze for them, such as volatile compounds and acid/base-neutral compounds, or by specific chemical classes such as poly-chlorinated biphenyls (PCBs) or dioxins. Sludge or residuals generated in industrial settings have the potential to contain these hazardous substances. Therefore, the DEP requires that generators test for these compounds before utilization. Examples of residuals found to contain these substances are sewage sludge with industrial inputs, paper mill sludge, and textile sludge.

When hazardous substances are detected in a residual, the DEP screens the concentrations of contaminants against risk-based standards in the solid waste rules. These standards were developed based on soil clean-up guidelines (e.g. EPA, 1994b; Smith, 1995). These guidelines are designed to protect a highly exposed individual ingesting either soil or groundwater contaminated by soil. The approach of screening residual concentrations against guidelines developed for soil errs on the side of protecting human health since the approach does not take into account the dilution, volatilization and degradation that will reduce contaminant concentrations at the utilization site (Overcash, 1981, Howard, 1991). However, in the majority of instances, the contaminant concentrations found in residuals are less than these conservative screening guidelines. In situations where residuals exceed these screening guidelines, site-specific research into degradation processes or more sophisticated risk assessments are conducted to determine if the residual can be safely utilized, or if it must be landfilled.

Odors: Nitrogenous solid wastes can generate offensive odors at utilization sites. These odors can be strong for several days and may last two weeks, depending on the residual being utilized and weather conditions. Mixing of odorous materials with other residuals, such as woodash, can alleviate odors. Site management practices, such as incorporation of the residual into the soil, setbacks to residences, or waiting for favorable weather conditions can also mitigate odor impacts. Under Chapter 419, the DEP requires that land appliers develop and implement a site-specific odor control plan to alleviate odorous emissions from utilization activities.

Groundwater monitoring: Scientists have done extensive research into the impacts on groundwater from the use of manure, sewage sludge and other residuals (e.g. Doak et.al, 1995; Dowdy et. al. 1993). Based on this research, the DEP was able to establish the residual standards and siting requirements described above to protect groundwater from adverse impacts. Therefore, the DEP does not require routine groundwater monitoring at utilization sites. The DEP does require that the generator monitor groundwater at utilization sites when the residual will be used in an innovative way and sufficient research has not been done on groundwater impacts. For instance, short-paper-fiber from paper recycling operations has been blended with mineral fertilizers or sewage sludge to make artificial topsoils. These topsoils have been used as the medium in which to grow the vegetative layer on dozens of landfills that have been closed in Maine. The topsoil demonstrates a superior resistance to erosion, and supports a healthier cover crop than natural

topsoils. As use of this artificial topsoil expands into gravel pit closures, the DEP is requiring that users monitor groundwater at reclamation sites to ensure that groundwater is not adversely impacted. The DEP has also entered into a cooperative agreement with the University of Maine to assess whether field storage of sewage sludge poses a contamination risk to groundwater through nitrate leaching. Nitrogen is generally the parameter of concern monitored at a utilization site since it has a higher mobility in the environment than pathogens, metals, or other organic pollutants (Dowdy, 1993; Larson, 1993; ERG, 1992; NWWA, 1989).

Economics: While solid waste by-products from industries may provide an agronomic benefit to farmers or foresters, improper utilization of these residuals can have deleterious effects on the environment as described above. Generators must remove residuals from treatment plants or factories on a regular basis or they interfere with the primary function of the facility, yet the residuals are only needed at the farm during limited windows of time dictated by crop production. Putrescible residuals may need to be composted or otherwise stabilized to allow for storage. Proper utilization requires that residuals be stored, transported and appropriately managed at the site of utilization, costing in the neighborhood of $20 to $45 a ton to land apply, and $30 to $60 a ton to compost. The marginal cost of landfilling ranges roughly from $5 per ton for a company to dispose of waste at its private landfill, to over $80 a ton at a commercial landfill. However, landfilling costs are significantly higher if the full cost of developing, operating, and closing new landfill space is factored in. Therefore, it would appear that direct agricultural utilization and composting prior to utilization would realize significant savings over landfilling, so materials will be recycled rather than landfilled. However, transportation costs are often the most significant factor precluding utilization. For instance, Great Northern Paper demonstrated that land application of their papermill sludge had a significant benefit of increasing crucial organic matter on potato land. However, the transportation costs to agricultural areas, as compared to transportation to the facility's adjacent landfill, precludes utilization of this resource. The dryness of a residual is also an important economic factor in determining the feasibility of utilizing a residual, since moisture content bears directly on the weight of the residual and influences how easily the residual can handled.

Some people advocate the deregulation of residual utilization, and allowing the free market to dictate use. The problem with this is that there are external costs that are not included in by-product handling that must be internalized. Simply stacking residuals outside the generator's gate has significantly lower short-term costs than proper utilization or disposal. However, external costs of groundwater contamination, public health impacts, or the generation of nuisances for abutters are not accounted for in this scenario. While the long-term costs of remediating environmental damage from improper disposal will be much greater than landfilling costs, this is not factored into the short-term cost equation. Therefore, DEP's regulation of residual utilization is needed to compensate for the short-term free market incentives to improperly handle these residuals. The regulations also serve to decrease a generator's long-term cost that would otherwise stem from remediating contaminated sites.

Conclusion: Utilization is the land application of solid waste residuals to derive an agronomic benefit. Since 1978, DEP regulations have effectively protected human health and the environment from the risks posed by utilization, while allowing the recycling of valuable resources back to the land, and providing cost-effective disposal options for generators. Specifically, the regulations require generators to meet residual quality standards, apply at agronomic rates, and adhere to siting standards. The regulations were revised in late 1999 to incorporate experience gained from implementing the rule during the previous two decades, the latest scientific research, and legislative changes. Continued regulation of utilization is necessary to maintain protection of human health and the environment, compensate for short-term free market

incentives to improperly handle residuals, and to avoid increased long-term costs to generators from remediating contaminated sites.

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Attachment A Heavy Metal Standards for Residuals

Table 2: Heavy Metals and Sewage Sludge

Metal	Sewage Sludge ME low	Sewage Sludge ME high	Sewage Sludge ME avg.	Sewage Sludge ME 99th%	Sewage Sludge US 99%	CH 419 screen std for Sewage Sludge	CH 419 ceiling std for sewage sludge	40 CFR 503 USEPA Screen Std	40 CFR 503 USEPA Ceiling Std	Natural Back-ground Soil Avg.	Natural Back-ground Soil Max
Arsenic	0.08	28.6	5.6	17.03	75	10	41	41	75	7.40	73
Cadmium	0.2	9.8	2.4	7	85	10	39	39	85	0.37	1
Copper	5.1	2010	388.0	1118	4300	1000	1500	1500	4300	23.3	237
Chromium	0.17	355	33.3	238	1200	1000	3000	N/A	N/A	30	140
Lead	1	220	61.5	162	840	300	300	300	840	17	75
Mercury	9.6	0.01	1.2	6	57	6	10	17	57	0.003	0.4
Molybdenum	0.66	62	7.5	61	75	75	75	N/A	75	0.79	15
Nickel	0.9	295	22.8	78	420	200	420	420	420	18	72
Selenium	0.03	33	2.6	17	36	100	100	100	100	0.45	3.9
Zinc	3	1800	468.5	1314	7500	2000	2800	2800	7500	68.5	153.4

- Maine sewage sludge metals are based on annual reports from sewage sludge generators for the years 1993-1997, consisting of 330 separate analysis reports from 64 Maine wastewater treatment plants
- Federal sludge metals are from the National Sewage Sludge Survey conducted by USEPA in 1989 on 208 sewage treatment plants.
- CH 419 screen std for sewage sludge means the screening standards for sewage sludge in DEP regulations 06-096 CMR Chapter 419, table 419.3
- CH 419 Ceiling std for sewage sludge means the ceiling standards for sewage sludge in DEP regulations 06-096 CMR Chapter 419, table 419.3
- 40 CFR 503 USEPA Screen Std means the Federal screening standards for sewage sludge found at 40 CFR Part 503, Table 3
- 40 CFR 503 Ceiling std means the Federal ceiling standards for sewage sludge found at 40 CFR Part 503, Table 1. Background Soil Avg means the estimated arithmetic mean of soil samples. For all metals except arsenic, molybdenum and selenium, the sample results are based on 1990-1994 reports from site operators in Maine. For arsenic, molybdenum and selenium, the sample results are those for the Eastern United States by Shacklette and Boerngen, USGS Report #1270, 1984.
- Background Soil-max means the maximum reported value in soil. Sample results obtained from sources referenced above for Soil Avg.

Table 3
Heavy Metal Standards in Chapter 419
for ash and other liming agents
(dry weight)

Parameter	CCE Equiv. 25%	CCE Equiv. 50%	CCE Equiv. 75%	Annual Metal Loading Rate (kg/ha)	Cumulative Loading Rate at Utilization site (kg/ha)	Ceiling conc in soil at utilization site (mg/kg)
Aluminum	362,383	724,767	N/A	9,750	195,000	100,000
Antimony	19	37	56	0.5	10	5
Arsenic	20	40	60	0.54	11	73
Barium	7,434	14,867	22,301	200	4,000	2,000
Beryllium	7	14	21	0.19	4	7
Cadmium	30	59	89	0.8	16	8
Chromium	141	282	424	4	76	38
Cobalt	21,836	43,672	65,508	588	11,750	5,875
Copper	5,575	11,150	16,725	150	3,000	1,500
Cyanide	35	71	106	0.95	19	10
Lead	1,394	2,788	4,181	38	750	375
Mercury	2	5	7	0.06	1	1
Molybdenum	1,812	3,624	5,436	49	975	488
Nickel	483	966	1,450	13	260	130
Selenium	19	37	56	0.5	10	5
Silver	126	253	379	3	68	34
Thallium	3	5	8	0.07	1	1
Vanadium	2,555	5,111	7,666	69	1,375	688
Zinc	10,407	20,814	31,221	280	5,600	2,800

Table 4
Screening Concentrations for Other Residuals in Chapter 419
and maximum allowable soil concentrations at utilization sites
mg/kg (dry weight)

	Screening Concentration for other residuals	*Ceiling Concentration in soil at Utilization sites*
Inorganic Compound	*Column A*	*Column B*
Aluminum	97,500	100,000
Antimony	5	5
Arsenic	5	73
Barium	2,000	2,000
Beryllium	2	7
Cadmium	8	8
Chromium	38	38
Cobalt	5,875	5,875
Copper	1,500	1,500
Cyanide	10	10
Lead	375	375
Mercury	1	1
Molybdenum	488	488
Nickel	130	130
Selenium	5	5
Silver	34	34
Thallium	1	1
Vanadium	688	688
Zinc	2,800	2,800