**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS**
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Office of Water Resources

# Rules and Regulations for the Treatment, Disposal, Utilization and Transportation of Sewage Sludge

April, 1997

Regulation #12-190-008

AUTHORITY: These rules and regulations are adopted pursuant to Chapters 42-35, 46-12, 42-17.1, 23-18.9 and 23-19.1 of the Rhode Island General Laws of 1956, as amended.

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## RULE 1. PURPOSE

The purpose of these rules and regulations is to ensure that sludge, composted sludge and treated sludge that is utilized, disposed or transported in the State is done so in a manner to protect public health and to avoid degradation of the environment. To achieve this purpose, these rules and regulations establish procedures governing the treatment, disposal, utilization and transportation of sludge, composted sludge, and treated sludge.

## RULE 2. AUTHORITY

These rules and regulations are promulgated pursuant to the requirements and provisions of Chapter 42-17.1, "Department of Environmental Management", Chapter 42-17.6, "Administrative Penalties for Environmental Violations", Chapter 46-12, "Water Pollution", Chapter 23-18.9, "Refuse Disposal", and Chapter 23-19.1, "Hazardous Waste Management" in accordance with the provisions of Chapter 42-35, "Administrative Procedures Act", of the Rhode Island General Laws of 1956, as amended.

## RULE 3. APPLICABILITY

(A) These rules and regulations apply to all sludge, composted sludge or treated sludge generated by publicly owned treatment works or privately owned treatment works that is utilized or disposed in the State of Rhode Island and all sludge that is treated in the State of Rhode Island. All sludge, composted sludge or treated sludge generated by publicly owned treatment works or privately owned treatment works in the State of Rhode Island or all sludge, composted sludge or treated sludge that enters the State of Rhode Island for the purposes of treatment, disposal or utilization within the State of Rhode Island shall also be subject to the transportation requirements of these rules and regulations.

(B) In addition to compliance with these rules and regulations, certain proposed facilities or sites may require compliance with legal requirements imposed by the federal government, other state agencies or Offices within the Department and/or local governmental entities (governmental requirements). These rules and regulations are intended to be and should be interpreted to be consistent and/or complementary with these governmental requirements and any perceived conflicts are unintentional. Should a perceived conflict arise between or among these rules and regulations and the governmental requirements imposed by other departmental regulations or other governmental entities, the most stringent requirement shall govern.

(C) Sludge generated by commercial or industrial operations may also be subject to applicable State and Federal regulations for solid or hazardous waste.

## RULE 4. LIBERAL APPLICATION

The terms and provisions of these rules and regulations shall be liberally construed to permit the Department to effectuate the purposes of state law, goals, and policies.

## RULE 5. DEFINITIONS

For the purposes of these rules and regulations, the following terms shall have the following meanings:

(A) "**Agricultural lands**" means those lands utilized for or having the potential for the production of food crops, feed crops or fiber crops.

(B) "**Aquifer**" means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells and springs.

(C) "**Applicant**" means a person who applies for an Order of Approval or the Commissioner's approval pursuant to these rules and regulations.

(D) "**Bulking agent**" means material such as sawdust, woodchips or yard trimmings which is added to the sludge to provide structure, lower total moisture content, allow air to reach and be held in small pockets by preventing settling and compaction of the sludge, and in some cases to act as a carbon source for the composting operation.

(E) **"Class A Biosolids"** means any composted sludge or treated sludge which meets the metals and pathogen limits established in Appendix 7 of these rules and regulations.

(F) **"Class B Biosolids"** means any composted sludge or treated sludge which meets the metals limits established in Appendix 8 of these rules and regulations.

(G) **"Class C Biosolids"** means any composted sludge or treated sludge which does not meet the metals limits in Appendices 7 and 8 of these rules and regulations.

(H) "**Composting**" means the biological method of stabilizing organic residues through an aerobic self-heating process.

(I) **"Composted sludge"** means the reduced pathogen, humus-like material resulting from composting sludge.

(J) **"Cover"** means soil or other approved material placed over sewage sludge in a land disposal site or sewage sludge or solid waste in a solid waste landfill.

(K) **"Department"** means the Rhode Island Department of Environmental Management.

(L) **"Commissioner"** means the Commissioner or the Director of the Department of Environmental Management or any designee to whom the Commissioner delegates any powers and duties vested in that office.

(M) **"Distributor"** means any person who distributes or markets Class A Biosolids. Any person that receives and distributes or markets packaged Class A Biosolids exclusively is not considered a distributor.

(N) **"Facility"** means any publicly or privately owned treatment works that produces or disposes of sludge, composted sludge or treated sludge.

(O) **"Feed crops"** means crops grown for consumption by animals.

(P) **"Fiber crops"** means crops, such as flax or cotton, that are cultivated for their fiber content and are not consumed by humans or by animals intended for human consumption.

(Q) **"Final cover"** means cover material which will be permanently exposed to the environment.

(R) **"Flood plain"** means that land area adjacent to a river which is, on the average, likely to be covered with flood water resulting from a 100-year frequency storm, and shall be that land so designated as flood plain on the U.S. Department of Housing and Urban Development Federal Insurance Administration Flood Hazard Boundary Map, currently administered by FEMA.

(S) **"Food crops"** means crops, including tobacco, consumed by humans.

(T) **"Groundwater"** means water found underground which completely fills the open spaces between particles of sediment and spaces within rock formations.

(U) **"Hazardous waste"** means any waste as defined in accordance with Section 23-19.1-4 of the General Laws of Rhode Island of 1956, as amended, and regulations adopted pursuant thereto.

(V) **"Incorporated into the soil"** means the injection of liquid sludge or liquid treated sludge beneath the surface of the soil or the mixing of sludge, composted sludge or treated sludge with the surface soil.

(W) **"ISDS regulations"** means the "Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems", Rhode Island Department of Environmental Management, August, 1994, as amended.

(X) **"Land application"** or **"land-applied"** means the spraying or spreading of sludge, composted sludge or treated sludge onto the land surface; the injection of liquid sludge or liquid treated sludge below the land surface; or the incorporation of sludge, composted sludge or treated sludge into the soil so that the sludge, composted sludge or treated sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

(Y) **"Lead free"** means any sludge, composted sludge or treated sludge having no lead present or having lead present in amounts less than the standards established in the Rhode Island Department of Health "Rules and Regulations for Lead Poisoning Prevention," as amended.

(Z) **"Lead safe"** means any sludge, composted sludge or treated sludge which pursuant to the Rhode Island Department of Health "Rules and Regulations for Lead Poisoning Prevention," as amended, poses no significant environmental lead exposure hazard despite having a lead concentration above that required for a designation as "lead free" (see subrule (W) above).

(AA) **"Monitoring well"** means a cased and screened well that intercepts the groundwater and can be used to detect the presence of groundwater contamination. All wells are to be designed based on criteria established by the Department.

(BB) **"Office of Water Resources"** means the Office of Water Resources of the Department of Environmental Management.

(CC) **"Operator"** means the person in control of or having responsibility for the daily operation of a facility or site.

(DD) **"Owner"** means the person named on the Federal National Pollutant Discharge Elimination System (NPDES) or the Rhode Island Pollutant Discharge Elimination System (RIPDES) permit issued for the facility or the applicant named on the Order of Approval or the person holding title to the site.

(EE) **"Pathogen"** means disease-causing organisms including, but not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

(FF) **"Person"** shall include an individual, trust, firm, joint stock company, corporation (including a quasi-governmental corporation), partnership, association, syndicate, municipality, municipal or state agency, fire district, club, non-profit agency or any subdivision, commission, department, bureau, agency or department of state or federal government (including any quasi-governmental corporation) or of any interstate body.

(GG) **"pH"** means the logarithm of the reciprocal of the hydrogen ion concentration (base 10).

(HH) **"Pollutant"** means any dredged material, solid waste, incinerator residue, sewage, garbage, sewage sludge, sediment, munitions, chemical wastes, septage, biological materials, radioactive materials, heat, wrecked or discarded equipment, cellar dirt, industrial, municipal, or agricultural waste or effluent, petroleum or petroleum products, including but not limited to oil; or any material which may alter the aesthetic, chemical, physical, biological, thermal or radiological characteristics and/or integrity of water, which may include rock and sand.

(II) **"Preparer"** means a publicly owned treatment works or privately owned treatment works that generates sewage sludge, composted sludge or treated sludge.

(JJ) **"Private drinking water supply well"** means any well established for the purpose of meeting all or part of a person's potable water needs provided said well does not supply a public drinking water supply.

(KK) **"Privately owned treatment works"** means any facility which is owned by a private individual or private party or corporation or other private entity and is used for the treatment of pollutants. This definition includes sewers, pipes if they convey wastewater to a privately owned treatment works as well as any equipment, buildings or machinery used in the treatment operation.

(LL) **"Processes to Significantly Reduce Pathogens (PSRPs)"** and **"Processes to Further Reduce Pathogens (PFRPs)"** means the processes listed in Appendix 3 and Appendix 4, respectively, which will reduce pathogens in sludge.

(MM) **"Public drinking water supply well"** means any well supplying a water system with piped water for human consumption, provided that such a system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year.

(NN) **"Publicly owned treatment works (POTW)"** means any facility which is used for the treatment of pollutants and is owned by the state or any political subdivision thereof, municipality, or other public entity, including any quasi-governmental corporation. This definition includes sewers, pipes if they convey wastewater to a POTW and any equipment, buildings or machinery used in the treatment operation.

(OO) **"Sewage"** or **"wastewater"** means human waste, or wastes from toilets and other receptacles intended to receive or retain body waste, and any wastes, including wastes from human households, commercial establishments, and industries.

(PP) **"Silviculture"** means the growing or cultivation of forests.

(QQ) **"Site"** means land used for the treatment, disposal, distribution or utilization of sludge, composted sludge or treated sludge.

(RR) **"Sludge"** or **"sewage sludge"** means residue, partially solid, or solid, treated or untreated, resulting from the treatment of sewage, including such residues from the cleaning of sewers, by processes, such as settling, floatation, filtration and centrifugation, that does not meet the criteria for a hazardous waste.

(SS) **"Solid waste regulations"** means the "Rules and Regulations for Solid Waste Management Facilities", Rhode Island Department of Environmental Management, April, 1992, as amended.

(TT) **"Surface water"** means any waters of the State that are not groundwaters.

(UU) **"Toxicity Characteristic Leachate Procedure (TCLP)"** means a quantitative analysis to determine hazardous characteristics as described in 40 CFR Part 261, Appendix II, issued March 29, 1990.

(VV) **"Transporter"** means the person transporting sludge, composted sludge or treated sludge or the person acting on behalf of the person transporting sludge, composted sludge or treated sludge. Any person that transports packaged Class A Biosolids exclusively is not considered a transporter.

(WW) **"Treated sludge"** means sewage sludge which is treated by a chemical, thermophilic or other alternative method to composting.

(XX) **"User"** means the person that utilizes composted sludge or treated sludge.

(YY) **"Vector"** means a carrier, usually an animal, capable of transmitting a pathogen from one organism to another.

(ZZ) **"Waters of the state"** or **"the waters"** means all surface water and groundwater of the State of Rhode Island, including all tidewaters, territorial seas, wetlands, land masses partially or wholly submerged in water, and both inter- and intra-state bodies of water which are, have been or will be used in commerce, by industry, for the harvesting of fish and shellfish or for recreational purposes.

(AAA) **"Well"** means a bored, drilled or driven shaft or a dug hole, with a depth greater than its largest surface dimension, through which groundwater flows under natural or induced pressure.

(BBB) **"Wellhead protection area"** means that portion of the ground surface and subsurface area surrounding a public well or wellfield through which water will move toward and reach such well or wellfield as designated by the Commissioner in accordance with the Rhode Island Wellhead Protection Program.

(CCC) **"Wetlands"** means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. For freshwaters, wetlands are determined by the Office of Water Resources using the Rules and Regulations Governing the Enforcement and Administration of the Freshwater Wetlands Act, as amended. Coastal wetlands are determined by rules and regulations under the jurisdiction of the Coastal Resources Management Council.

## RULE 6. OPERATIONS

(A) The owner or operator of a publicly owned treatment works or privately owned treatment works is required to operate and maintain properly all equipment and systems used to achieve compliance with these rules and regulations. Proper operation and maintenance includes effective performance, adequate funding, adequate staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures.

(B) Upon any interruption in operations of the facility due to loss or reduction of power or other equipment failure, the owner or operator shall control disposal, operations and management of the facility to the extent necessary to maintain compliance with these rules and regulations until such time as power or other equipment is restored or an alternative method of disposal is provided.

(C) The owner or operator shall take immediate action necessary to correct any non-compliance with these rules and regulations when such non-compliance may have an adverse effect on public health or the environment.

(D) The owner or operator shall notify the Office of Water Resources in writing, at least ninety (90) days prior to any alteration or modification of the facility, change in the disposal, use or transportation practices of the facility, or activity which may result in non-compliance with these rules and regulations.

(E) The owner or operator shall immediately notify the Office of Water Resources of any substantial change in the volume or composition of sludge, composted sludge or treated sludge resulting from the introduction of pollutants into the facility. The notice shall include information on the quantity and composition of sludge, composted sludge or treated sludge, the source of the new pollutants or efforts made to discover the source, and any impacts on utilization or disposal practices resulting from the change.

## RULE 7. ORDER OF APPROVAL

(A) An Order of Approval must be obtained for each facility and for each site by either the owner or operator of the facility or site. The owner or operator of the facility or site must operate at all times in accordance with the Order of Approval and the completed Application for an Order of Approval (see Appendix 1).

(B) Rule 7(A) does not apply to a site upon which Class A Biosolids is land applied.

(C) All transporters must operate at all times in accordance with the Order of Approval.

(D) The applicant must submit to the Commissioner an Application for an Order of Approval (Appendix 1). The application must be submitted at least ninety (90) days prior to the anticipated date of operation. Said applications must be accompanied by a fee of $150.00 per application, plans, specifications and an operating plan as stipulated in these rules

and regulations. An applicant may apply to the Commissioner for approval to conduct a one-time pilot project utilizing no more than thirty (30) cubic yards of Class A Biosolids or Class B Biosolids. No application fee is required for such projects. Where land for the disposal, treatment, distribution or utilization of sludge, composted sludge or treated sludge is not owned by the applicant, certified copies of any lease or contracted agreements or other documentation acceptable to the Department providing the applicant with adequate authority to engage in the proposed activity on the subject site must also be submitted. Where such information has been previously submitted to the Commissioner and approved and where the applicant proposes to continue the previously approved means of disposal, treatment, distribution or utilization or when utilizing a state approved site, the Commissioner may waive the requirement that additional plans, specifications and operation and maintenance manuals accompany the application.

(E) Notice of the Commissioner's initiation of proceedings to review an application shall be provided by the applicant to all potentially affected parties as determined by the Commissioner. At a minimum, the applicant shall notify all owners of land abutting the site of the proposed activity. The Commissioner shall schedule a public hearing as required pursuant to Rhode Island General Laws Chapter 42-35 to solicit public comment prior to rendering a decision on the application. The applicant shall be required to pay the expenses for notice and hearing.

(F) The owner of an approved facility or site who seeks to change the treatment, disposal, distribution or utilization methods, or who seeks to add facilities or sites, must apply for a new Order of Approval for such modifications at least ninety (90) days prior to the anticipated modification.

(G) Approval of the application must be made prior to implementation of the treatment or utilization method or disposal or distribution at the site. Said approval shall remain in full force and effect until terminated by the Commissioner.

(H) In those instances where treatment, disposal, distribution or utilization is delegated by the owner to another party, it shall remain the responsibility of the owner to meet all requirements of these rules and regulations and to submit the necessary documents for the Commissioner to issue an Order of Approval.

(I) Approval of a facility or site involves an initial evaluation of the plan in accordance with Rules 9, 11 and 13 of these rules and regulations.

(J) An owner of a facility or site may apply to the Commissioner for a transfer of the Order of Approval to a new owner. The current owner must apply to the Commissioner in writing by certified mail of the proposed transfer at least ninety (90) days prior to the proposed transfer date and must include the following information:

(1) Name and address of current facility or site;
(2) Name and address of new owners and operators;
(3) Names and addresses of persons upon whom the Commissioner may serve legal process;
(4) A notarized statement signed by a duly authorized officer or agent of the new owner stating that he or she has read the original application for an Order of Approval and believes that to the best of his or her knowledge there has been no material change in the operations of the facility or site since the Order of Approval was issued or describes the changes that have occurred since the Order of Approval was issued, and
(5) A proposed transfer date on which the new owner will assume the Order of Approval and all accompanying responsibility.

(K) The Commissioner may approve a change in the method of treatment, disposal, utilization, or transportation of sludge, composted sludge or treated sludge from a publicly owned treatment works or privately owned treatment works for emergency situations without requiring the owner or operator of the facility to first apply for an Order of Approval. The owner or operator of the facility must submit to the Commissioner an Application for an Order of Approval within fourteen (14) days of receiving an emergency approval from the Commissioner in accordance with Rule 7(D).

## RULE 8. LAND DISPOSAL - GENERAL REQUIREMENTS

This rule applies to the disposal of sludge, composted sludge or treated sludge by burial. All applications for land disposal sites are to be in accordance with the design and operational requirements for solid waste landfills as promulgated by the Office of Waste Management, Rhode Island Department of Environmental Management. All land disposal sites must operate under an Order of Approval. (Burial at a solid waste landfill is covered under Rule 16.)

(A) Condition of Sludge, Composted Sludge or Treated Sludge

Sludge, composted sludge or treated sludge that is land disposed must be treated by one of the Processes to Significantly Reduce Pathogens (see Appendix 3). Such treatment is the responsibility of the owner or operator of the facility. Sludge, composted sludge or treated sludge that is land disposed shall not meet the criteria for hazardous waste.

(B) Groundwater

A minimum of five (5) feet of soil is required between the lowest level of deposited sludge, composted sludge or treated sludge and the highest water table level established during the seasonal high groundwater table period determined by the Department in accordance with the Department's ISDS regulations. In addition, a minimum of five (5) feet of soil is required between the highest level of bedrock and lowest level of deposited sludge, composted sludge or treated sludge. If the owner or applicant seeks a variance from the separation distances under Rule 21 of these rules and regulations, the Commissioner may require the installation of an impermeable liner system or other means to prevent leachate from reaching the groundwater as a condition for the granting of such variance.

(C) Surface Water

No sludge, composted sludge or treated sludge shall be land disposed within 200 feet of any body of surface water. No sludge, composted sludge or treated sludge shall be land disposed within one thousand two hundred (1200) feet from the center line of the following freshwater rivers: Ashaway River, Beaver River, Blackstone River, Chepachet River, Clear River, Falls River, Flat River, Hunt River, Moshassuck River, Moosup River, Narrow River, Pawcatuck River, Pascoag River, Pawtuxet River, and Wood River. No sludge, composted sludge or treated sludge shall be disposed of in the watershed of any surface water used as a public drinking water supply. The Commissioner may, if necessary, require continuous monitoring of any surface water courses in the vicinity of the proposed land disposal site. Such monitoring shall be of a type and frequency determined by the Commissioner on a case-by-case basis and shall be the responsibility of the owner or operator.

(D) Drinking Water Wells

No sludge, composted sludge or treated sludge shall be disposed within one thousand (1,000) feet of any private drinking water supply well or within the wellhead protection area for a public well. Land disposal of sludge, composted sludge or treated sludge shall be in accordance with the Rhode Island Groundwater Protection Act of 1985, 46-13.1 and any rules and regulations promulgated thereunder.

(E) Distance to Buildings

No sludge, composted sludge or treated sludge shall be disposed within six hundred (600) feet of any domestic, commercial or industrial structure not associated with the proposed land disposal site.

(F) Distance to Property Lines

No sludge, composted sludge or treated sludge shall be disposed within two hundred (200) feet of a property line.

(G) Monitoring Wells

For the purpose of monitoring groundwater conditions, the owner or operator of a land disposal site shall install and maintain monitoring wells of a number and type approved by the Commissioner and at locations chosen by the Commissioner. The owner or operator of the site is responsible for analysis of groundwaters in accordance with instructions of the Commissioner. The director shall determine the testing and reporting frequency.

(H) Erosion Control

The owner shall make provisions to have the land disposal site, including the fill surface, graded and provided with a drainage system to minimize surface water runoff onto and into the fill, to drain off rain water falling on the fill and to prevent the collection of standing water.

(I) Transportation

All sludge, composted sludge or treated sludge shall be transported in vehicles which are properly sealed, watertight and covered while in transit so as to prevent any leaking or dropping of sludge, composted sludge or treated sludge.

(J) Cover Material

A soil cover of at least six (6) inches shall be applied to all sludge, composted sludge or treated sludge deposits daily to control disease vectors and nuisance conditions. Final cover in terminating the use of a disposal site shall be two (2) feet in depth.

(K) Odor Control

Any land disposal site must comply with the Rhode Island Department of Environmental Management, Office of Air Resources Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors.

(L) Analysis of Sludge, Composted Sludge or Treated Sludge

All sludge, composted sludge or treated sludge intended for land disposal may be required to be tested using the Toxicity Characteristic Leaching Procedure for the parameters listed in Appendix 6 and the results submitted to the Office of Water Resources. The owner or operator of the facility is responsible for all analyses. The Commissioner shall determine the testing and reporting frequency depending upon the amount of sludge, composted sludge or treated sludge produced.

## RULE 9. LAND DISPOSAL - SUBMISSIONS FOR APPROVAL

Plans and submissions required by Rules 9(B) - (F) below must be stamped by a registered professional engineer or land surveyor. The plans should be scaled to fit on a standard 24 x 36 inch sheet wherever possible. Larger sheets must be used when the minimum scale requirements do not permit the use of 24 x 36 inch sheets. The Commissioner may require additional information if necessary to satisfy the requirements of these rules and regulations.

(A) Initial Investigation Plans

Copies of the latest U.S. Geological Topographic Map, Farm Services Agency aerial maps and the United States Department of Agriculture Soil Survey Map, with the land disposal site outlined and an indication of the required setbacks, must be submitted to the Office of Water Resources prior to all other required information. This will allow initial evaluation of the plan relating to wetlands, aquifers, and soil type before large investigatory and developmental expenditures are made. A report of the evaluation shall be made to the applicant. The report shall list what submissions, if any, from Rules 9(B) - (J) below must be submitted to the Office of Water Resources to obtain an Order of Approval.

(B) Radius Plan

A radius plan shall be submitted. The radius plan must be drawn at a minimum scale of one inch to two hundred feet (1"=200') and include all areas within a one quarter (1/4) mile radius from all property lines of the land disposal site. The radius plan must include the following information:

(1) All buildings;
(2) All water supplies (wells, etc.);
(3) All surface water courses and wetlands;
(4) All roads;
(5) All boring locations;
(6) Legal boundaries of site;
(7) North arrow;
(8) Extent of one hundred (100) year flood plain (where applicable), and
(9) Local zoning and permitting requirements.

(C) Site Plan

A site plan shall be submitted for all areas within the land disposal site. The site plan must be drawn to a minimum scale of one inch to one hundred feet (1"=100'). The site plan must include the following information:

(1) Initial ground contours at five-foot intervals;
(2) Final proposed contours at five-foot intervals;
(3) Boring locations;
(4) Proposed leachate collection and treatment systems;
(5) Proposed gas controls (if any);
(6) Buildings (if any);
(7) Wells (if any);
(8) Surface water courses (if any);
(9) Roads (if any);
(10) Cross Section lines (see Rule 9(D));
(11) Ground water monitoring wells;
(12) Legal boundaries of site;
(13) Power lines, pipe lines, rights of way and other utilities;
(14) Proposed fences;
(15) Weighing facilities (if any);
(16) North arrow;
(17) Location of borrow areas (if any), and
(18) Boundaries of areas to be filled as indicated in operating plan (see Rule 9(H)).

(D) Cross Section

Typical cross section plans of the land disposal site shall be submitted. A minimum of two cross sections are required of right angled center lines passing through the approximate middle of the land disposal site. The cross section plans should be drawn using a minimum horizontal scale of one inch to one hundred feet (1"=100'). All required details should be drawn using equal vertical and horizontal scales. The cross section plans must include the following information:

(1) Proposed lifts;
(2) Virgin ground;
(3) Maximum groundwater table;
(4) Bedrock location;
(5) Side slopes;
(6) Details of surface drains and ditches;

(7) Final fill elevation and grades;
(8) Limits of excavations;
(9) Final cover elevations;
(10) Details on access road construction;
(11) Details of leachate collection and treatment systems;
(12) Details of gas venting facilities (if any), and
(13) Details of ground water monitoring wells with soil profiles.

(E) Soil Borings

Borings are required of all proposed areas to be filled. The minimum number of borings required are listed below:

| Proposed No. of Acres to be Filled | No. of Borings |
|---|---|
| 1 - 10 | 3 |
| 11 - 50 | 6 |
| 51 - 100 | 12 |
| 101 - 200 | 18 |
| Over 200 | 24 plus 1 for every 10 acres over 200 |

Split spoon samples shall be collected at a minimum of five (5) foot intervals. A soil description shall be provided for each split spoon sample. All borings should be driven to a minimum depth of twenty (20) feet below the proposed bottom level of sludge, composted sludge or treated sludge or to refusal. The following information contained on the boring logs should be submitted:

(1) Depth of the maximum elevation of the groundwater table (to be measured at a minimum of twenty four (24) hours after the boring is taken);
(2) A detailed soil profile description to a depth of four (4) feet must be submitted for each soil mapping unit on the land disposal site. The required information includes:

(a) Color of each horizon;
(b) Texture of each horizon;
(c) Depth of each horizon;
(d) Depth to mottles (if any);
(e) Amount of coarse fragments (if any);
(f) Depth to bedrock (if encountered);
(g) Consistence or relative density, and
(h) Slope.

(3) Method of boring;
(4) Blow counts, and
(5) Date boring was taken.

The boring should be located to give the best indications of subsurface conditions for the whole land disposal site that can be obtained considering the limited number of borings required. The groundwater table elevation determination shall be made when the water table is highest; this occurs usually during the months of January through April. (Specific dates may be determined on a yearly basis by the Commissioner.) All boring holes must be maintained for future water table elevation determinations. If the Commissioner feels it necessary, additional borings may be required.

(F) Groundwater Survey

A groundwater survey showing the maximum groundwater elevations, the direction of groundwater flow, and an estimation of the rate of flow (including calculations) shall be submitted.

(G) Site Delineation

The following land disposal site areas shall be marked with stakes at the time of engineering survey. The stakes must be a minimum of two (2) feet high, clearly visible and maintained at all times. All sites shall include the following delineations:

(1) Areas enclosed by legal boundaries; and
(2) Areas to be filled as indicated in the Operating Plan.

(H) Operating Plan

All applications for land disposal sites are to be in accordance with the design and operational requirements for solid waste landfills as promulgated by the Department's Office of Waste Management.

An operating plan shall be submitted detailing operating procedures for a two-year period. No later than ninety (90) days prior to the end of this two-year period, a new operating plan shall be submitted which covers the following two (2) years. All operating plans must include the following information:

(1) Type of method to be used (trench, area, etc.);
(2) Provisions for appropriate liners;
(3) Proposed sequence of operation;
(4) Estimate of amount of cover material available or to be purchased and from whom;
(5) Operating hours;
(6) Personnel and duties;
(7) Projected use of completed land disposal site;
(8) Dust control program;
(9) Vector control program;
(10) Odor control program;
(11) Procedures to control erosion and sedimentation and to promote vegetative growth in completed areas;
(12) Equipment to be on site during operating hours;
(13) Substitute equipment available;
(14) Communications equipment available;
(15) Population and service area;
(16) Winter operations;
(17) Provisions for limiting access such as fencing, signs, etc.;
(18) Weighing facilities (if any);
(19) Estimated life of land disposal site;
(20) Aesthetic considerations;
(21) Leachate treatment operations, and
(22) Surface drainage control methods.

(I) Closure Plan

A closure plan for all areas within the land disposal site shall be submitted. The closure plan must be drawn to a minimum scale of one inch to one hundred feet (1" = 100'). The closure plan must include the following information:

(1) Date of proposed closure;
(2) Methods of restricting access and preventing additional disposal;

(3) Methods of protecting ground and surface water and controlling air emissions;
(4) Date on which all land disposal areas will be covered with two (2) feet of final cover;
(5) Date of installation of impermeable covering, if any, and planting with vegetation;
(6) Final grades and method of maintaining final grades and promoting surface runoff;
(7) Fences and gates;
(8) Location and description of groundwater and surface water monitoring stations and provision that such monitoring shall continue on a quarterly basis for up to five (5) years after the site is closed, and
(9) Legal boundaries.

In addition, the applicant shall set aside a post-closure monitoring fund for a monitoring period of up to thirty (30) years subsequent to the closure of the land disposal site. The applicant shall establish a post-closure monitoring and maintenance fund designated "in trust for the post-closure monitoring and maintenance of the land disposal site." A bank or other financial institution approved by the Commissioner shall act as trustee of the trust fund. The trust instrument shall provide that the Commissioner shall have the right to use such part of the fund as is necessary to carry out the post-closure monitoring and maintenance for the land disposal site in accordance with these rules and regulations. The trust instrument shall also provide that the Commissioner shall determine whether post-closure expenditures are reasonable and in accordance with the closure plan. The trustee shall release these funds upon receipt of a written request from the Commissioner.

(J) Analysis of Sludge, Composted Sludge or Treated Sludge

All results of the analysis required in Rule 8(L) of these rules and regulations must be on file with the Office of Water Resources at the time of application.

(K) Application for Order of Approval

Any person that proposes to land dispose sludge, composted sludge or treated sludge must submit an Application for Order of Approval (see Appendix 1) as described in Rule 7 of these rules and regulations.

(L) Site Information Sheet

For all land disposal sites, the applicant must submit a completed Site Information Sheet (see Appendix 2). The Site Information Sheet must be on file with the Office of Water Resources at the time of application.

## RULE 10. LAND APPLICATION OF SLUDGE - GENERAL REQUIREMENTS

This rule applies to the utilization of sludge for land application or incorporation of sludge into the soil. All projects utilizing sludge must operate under an Order of Approval and must meet the following requirements:

(A) Sludge and Soil Analysis

All sludge intended for land application may be required to be tested using the Toxicity Characteristic Leaching Procedure for the parameters listed in Appendix 6 and the results submitted to the Office of Water Resources. Sludge intended for land application must meet the limits established in Appendix 8 for metals and must be tested for the listed characteristics. In addition, soil from the proposed land application site, with the exception of silvicultural lands, must be tested for metals listed in Appendix 8 and for the parameters listed in Rule 11(F) below. The Commissioner shall determine the testing and reporting frequency. All sludge analyses shall be the responsibility of the owner or operator of the facility; all soil analyses will be the responsibility of the applicant.

(B) Land Application Rates

All sludge intended for land application must be applied at an annual rate not to exceed the amount necessary to supply adequate available nitrogen for crop production using good agricultural or silvicultural practices or not to exceed the

maximum annual rates recommended by the U.S. Department of Agriculture to achieve fertilizer benefits and soil improvement.

(C) Cumulative Loading Rates

The maximum amount of sludge that can be applied to a land application site shall be calculated using the procedure established in Appendix 9. The amount of metals in the soil shall be deducted from each calculation.

(D) Condition of Sludge

Sludge intended for land application shall be treated by one of the Processes to Significantly Reduce Pathogens (described in Appendix 3) and one of the vector attraction reduction requirements (described in Appendix 5). Such treatment shall be the responsibility of the owner or operator of the facility. Sludge intended for land application shall not meet the criteria for hazardous waste.

(E) Crops

Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for fourteen (14) months after application of sewage sludge. Food crops with harvested parts below the surface of the land shall not be harvested for twenty (20) months after application of sewage sludge when the sewage sludge remains on the land surface for four (4) months or longer prior to incorporation into the soil. Food chain crops with harvested parts below the surface of the land shall not be harvested for thirty eight (38) months after application of sewage sludge when the sewage sludge remains on the land surface for less than four (4) months prior to incorporation into the soil. Food crops with harvested parts that do not touch the sewage sludge/soil mixture, feed crops and fiber crops shall not be harvested for thirty (30) days after application of sewage sludge.

(F) Turf

Turf grown on land where sewage sludge is applied shall not be harvested for one (1) year after the last application of sewage sludge has occurred when the harvested turf is placed on either land with a high potential for public exposure or a lawn.

(G) Public Access

Public access to the land application site shall be prohibited by the owner or operator until one (1) year has passed since the last application of sewage sludge to land with a high potential for public exposure, such as a park or ballfield or thirty (30) days has passed since the last application of sewage sludge to land with a low potential for public exposure, such as private farmland.

(H) Animal Grazing

Animals whose products are consumed by humans shall not be allowed to graze on land where sewage sludge is applied for thirty (30) days after the last application of sewage sludge has occurred.

(I) Frozen Ground

No sludge shall be applied to frozen, flooded or snow-covered ground unless appropriate erosion and runoff control measures are provided.

(J) Odor Control

Any land application project must comply with the Department's Office of Air Resources Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors.

(K) Groundwater

A minimum of two (2) feet of soil is required between the lowest level of applied sludge and the highest water table level established during the seasonal high groundwater table period determined by the Department in accordance with the Department's ISDS regulations. In addition, a minimum of three (3) feet of soil is required between the highest level of bedrock and the lowest level of applied sludge.

(L) Surface Water

No sludge shall be land applied within two hundred (200) feet of any body of surface water. No sludge shall be applied to land within the watershed of any surface water used as a public drinking water supply. The Commissioner may, if necessary, require continuous monitoring of any surface water courses in the vicinity of the proposed land application site. Such monitoring shall be of a type and frequency determined by the Commissioner on a case-by-case basis and shall be the responsibility of the owner or operator. This requirement will be met if the applicant demonstrates to the satisfaction of the Department that the proposed project will not affect surface water.

(M) Drinking Water Wells

No sludge shall be land applied within one thousand (1,000) feet of any private drinking water supply well or within the wellhead protection area for a public well. Land application of sludge shall be in accordance with the Rhode Island Groundwater Protection Act of 1985, General Laws Chapter 46-13.1 and any rules and regulations promulgated thereunder.

(N) Distance to Buildings

No sludge shall be land applied within four hundred (400) feet of any domestic, commercial or industrial structure not associated with the proposed land application project.

(O) Distance from Property Lines

No sludge shall be land applied within one hundred (100) feet of a property line. This requirement will be met if consent from the adjacent land owner is received.

(P) Monitoring Wells

Groundwater monitoring shall be of a type and frequency determined by the Commissioner on a case-by-case basis and shall be the responsibility of the owner or operator.

(Q) Erosion Control

Soil erosion on all land application sites shall be limited to conditions which meet Resource Management System Quality Criteria for soil erosion as defined in the USDA Natural Resources Conservation Service (NRCS) Field Office Technical Guide for Rhode Island. Erosion control methods on all land application sites shall be consistent with practice standards and specifications in the NRCS Field Office Technical Guide for Rhode Island. Sediment and runoff shall be controlled on all land application sites consistent with the measures within the Rhode Island Erosion and Sediment Control Handbook, USDA, SCS, 1990.

(R) Transportation

All sludge shall be transported in vehicles which are properly sealed, watertight and covered while in transit so as to prevent any leaking or dropping of sludge.

## RULE 11. LAND APPLICATION OF SLUDGE - SUBMISSIONS FOR APPROVAL

Plans and submissions required by Rules 11(B) - (E) below must be stamped by a registered professional engineer or land surveyor. The plans should be scaled to fit on a standard 24 x 36 inch sheet whenever possible. Larger sheets must be used when the minimum scale requirements do not permit the use of 24 x 36 inch sheets. The Commissioner may require additional information if necessary to satisfy the requirements of these rules and regulations.

(A) Initial Investigation Plans

Copies of the latest U.S. Geological Topographic Map, Farm Services Agency aerial maps and the United States Department of Agriculture Soil Survey Map, with the land application site outlined and an indication of the required setbacks, must be submitted to the Office of Water Resources prior to all other required information. This will allow initial evaluation of the plan relating to wetlands, aquifers, and soil type before large investigatory and developmental expenditures are made. A report of the evaluation shall be made to the applicant. The report shall list what submissions, if any, from Rules 11(B) - (I) below must be submitted to the Office of Water Resources to obtain an Order of Approval.

(B) Radius Plan

A radius plan shall be submitted. The radius plan must be drawn at a minimum scale of one inch to two hundred feet (1"=200') and include all areas within a one quarter (1/4) mile radius from all property lines of the site. The radius plan must include the following information:

(1) All buildings;
(2) All water supplies (wells, etc.);
(3) All surface water courses and wetlands;
(4) All roads;
(5) Legal boundaries of land application site;
(6) North arrow;
(7) Extent of one hundred (100) year flood plain (where applicable), and
(8) Local zoning and permitting requirements.

(C) Site Plan

A site plan for all areas within the land application site shall be submitted. The site plan must be drawn to a minimum scale of one inch to one hundred feet (1"=100'). The site plan must include the following information:

(1) Detailed soil map;
(2) Buildings (if any);
(3) Wells (if any);
(4) Surface water courses (if any);
(5) Roads (if any);
(6) Groundwater monitoring wells;
(7) Proposed erosion control and runoff collection and treatment systems (if any);
(8) Legal boundaries of site;
(9) Power lines, pipe lines, rights of way and other utilities, and
(10) North arrow.

(D) Soil Description

A detailed soil profile description to a depth of four (4) feet must be submitted for each soil mapping unit on the land application site. The required information includes:

(1) Color of each horizon;

(2) Texture of each horizon;
(3) Depth of each horizon;
(4) Depth to mottles (if any);
(5) Amount of coarse fragments (if any);
(6) Depth to bedrock (if encountered);
(7) Consistence or relative density, and
(8) Slope.

(E) Groundwater Survey

A groundwater survey showing the maximum groundwater elevations, the direction of groundwater flow, and an estimation of the rate of flow (including calculations) shall be submitted.

(F) Laboratory Data

Representative samples shall be taken from the plow layer within the proposed land application site. The following data shall be submitted for each sample:

(1) Soil Density;
(2) Depth of Sample, and
(3) Moisture Content (%).

(G) Operating Plan

An operating plan shall be submitted detailing procedures for a two-year period. No later than ninety (90) days prior to the end of this two-year period, a new operating plan shall be submitted which covers the following two (2) years. All operating plans shall include the following information:

(1) Type of land application method to be used;
(2) Detailed description of the sludge utilization project and the proposed sequence of operation;
(3) Provisions for compliance with Rule 10 of these rules and regulations;
(4) Personnel and duties;
(5) Projected use of the land application site;
(6) Procedures to control dust, vectors and odor;
(7) Procedures to control erosion, sedimentation and promote vegetative growth;
(8) Equipment to be utilized and substitute equipment to be on-site;
(9) Provisions to control access;
(10) Estimated life of sludge utilization area, and
(11) Aesthetic considerations.

(H) Sludge and Soil Analysis

The results of the sludge analysis and soil analysis required in Rule 10(A) of these rules and regulations must be on file with the Office of Water Resources at the time of application.

(I) Application for Order of Approval

Any person that proposes to land apply sludge must submit an Application for Order of Approval (see Appendix 1) as described in Rule 7 of these rules and regulations.

(J) Site Information Sheet

For all land application sites, the applicant must submit a completed Site Information Sheet (see Appendix 2). The Site Information Sheet must be on file with the Office of Water Resources at the time of application.

## RULE 12. COMPOSTING OF SLUDGE - GENERAL REQUIREMENTS

Composting of sludge shall be permitted as a means of sludge treatment if the owner meets the requirements presented in this rule.

(A) Sludge Composting Operations

All methods of sludge composting must comply with the definitions of thermophilic composting as a Process to Further Reduce Pathogens as listed in Appendix 4 and must meet one of the vector attraction reduction requirements described in Appendix 5. Any sludge composting operation must comply with the Department's Office of Air Resources Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors and must operate under an Order of Approval. Any co-composting of sludge and solid waste must comply with rules and regulations under the Department's Office of Waste Management.

(1) Sludge Composting Methods

Sludge composting may be practiced by the methods described below. Any comparable method of sludge composting shall be considered by the Commissioner for approval.

(a) Aerated static pile

If this method is proposed, the sludge must be maintained at operating conditions of 55°C or greater for three (3) consecutive days. The sludge must remain in the active phase for a minimum of twenty one (21) days in a pile not to exceed twelve (12) feet in height. At the end of the active phase, the material must be cured for a minimum of thirty (30) days in a stockpile not to exceed twelve (12) feet in height unless the Department determines that such curing is not necessary. Such composting operations shall be provided with an appropriate leachate collection system, shall be built on an impervious surface and shall be protected from direct rainfall by a roof to reduce the amount of leachate.

(b) Windrow

If this method is proposed, the sludge must be maintained at operating conditions of 55°C or greater for at least fifteen (15) consecutive days during the active phase. The sludge must remain in the active phase for a minimum of twenty one (21) days in a pile, with the sludge being turned at least once every three (3) days. Height of the pile shall be compatible with the equipment used for turning the sludge. The active phase shall be followed by a curing period of at least thirty (30) days in a curing pile not to exceed twelve (12) feet in height unless the Department determines that such curing is not necessary. Such composting operations shall be provided with an appropriate leachate collection system, shall be built on an impervious surface and shall be protected from direct rainfall by a roof to reduce the amount of leachate.

(c) In-vessel

If this method is proposed, the sludge must be maintained at operating conditions of 55°C or greater for three (3) consecutive days. The sludge must remain in the active phase for a minimum of fourteen (14) days. The active and curing phases are to be maintained for a total minimum period of thirty (30) days. If sludge is cured in a curing pile, the pile is not to exceed twelve (12) feet in height.

(2) Groundwater

A minimum of two (2) feet of soil is required between the proposed sludge composting surface and the highest water table level established during the seasonal high groundwater table period determined by the Department in accordance with the Department's ISDS regulations. In addition, a minimum of three (3) feet of soil is required between the highest level of bedrock and the sludge composting surface. If the owner or applicant seeks a variance of the separation distances under Rule 21 of these rules and regulations, the Commissioner will require the installation of an impermeable liner system or other means to prevent leachate from reaching the groundwater as a condition for the granting of such variance. This requirement will be met if the applicant demonstrates to the satisfaction of the Office of Water Resources that the sludge composting operation will not generate leachate.

(3) Surface Water

No sludge shall be composted within two hundred (200) feet of any body of surface water. No sludge shall be composted within the watershed of any surface water used as a public drinking water supply. The Commissioner may, if necessary, require continuous monitoring of any surface water courses in the vicinity of the sludge composting site. Such monitoring shall be of a type and frequency determined by the Commissioner on a case-by-case basis and shall be the responsibility of the owner or operator. This requirement will be met if the applicant demonstrates to the satisfaction of the Department that any runoff from the sludge composting operation will not affect surface water.

(4) Drinking Water Wells

No sludge shall be composted within one thousand (1,000) feet of any private drinking water supply well or within the wellhead protection area for a public well. Composting of sludge shall be in accordance with the Rhode Island Groundwater Protection Act of 1985, General Laws Chapter 46-13.1 and any rules and regulations promulgated thereunder. This requirement will be met if the applicant demonstrates to the satisfaction of the Department that the sludge composting operation will not generate leachate.

(5) Distance to Property Lines

No sludge shall be composted within four hundred (400) feet of a property line. This requirement will be met if the applicant demonstrates to the satisfaction of the Department that the facility is completely enclosed.

(6) Monitoring Wells

For the purpose of monitoring ground water conditions, the owner or operator of a sludge composting site shall install and maintain monitoring wells of a number and type approved by the Commissioner and at locations chosen by the Commissioner. The owner or operator of the site is responsible for analysis of ground waters in accordance with instructions of the Commissioner. The Commissioner shall determine the testing and reporting frequency. This requirement will be met if the applicant demonstrates to the satisfaction of the Department that the sludge composting operation will not generate leachate.

(7) Transportation

All sludge shall be transported in vehicles which are properly sealed, watertight and covered while in transit so as to prevent any leaking or dropping of sludge.

(8) Sludge and Composted Sludge Storage

The stockpiling of uncomposted sludge is prohibited. Arrangements must be made to compost all sludge immediately upon arrival at the composting facility. The storage of composted sludge shall be allowed if the

applicant can demonstrate, to the satisfaction of the Department, that the storage site will not impact surface water and groundwater.

(9) Sludge and Bulking Agent Analysis

All sludge intended for composting and bulking agents may be required to be tested using the Toxicity Characteristic Leaching Procedure for the parameters listed in Appendix 6 and the results submitted to the Office of Water Resources. The Commissioner shall determine the testing and reporting frequency. All sludge analyses shall be the responsibility of the owner of the facility that produced the sludge; all bulking agent analyses shall be the responsibility of the owner of the sludge composting facility.

(10) Condition of Sludge and Bulking Agents

All sludge intended for composting and all bulking agents shall not meet the criteria for hazardous waste.

(B) Composted Sludge Quality

Any composted sludge which meets the limits established in Appendix 7 shall be considered Class A Biosolids; the requirements and restrictions for the distribution and use of Class A Biosolids are listed in Rule 12(D) of these rules and regulations. Any composted sludge which meets the limits established in Appendix 8 shall be considered Class B Biosolids; the requirements and restrictions for the use of Class B Biosolids are listed in Rule 12(E) and 12(F) of these rules and regulations. Any composted sludge which does not meet the limits established in Appendices 7 and 8 shall be considered Class C Biosolids; the requirements and restrictions for the use of Class C Biosolids are listed in Rule 12(G) of these rules and regulations.

(C) Composted Sludge Analysis

Class A Biosolids must be tested for the metals and the pathogens listed in Appendix 7. Class B Biosolids and Class C Biosolids must be tested for the metals and the characteristics listed in Appendix 8. All results must be submitted to the Office of Water Resources. The Commissioner shall determine the testing and reporting frequency. All composted sludge analysis shall be the responsibility of the owner or operator of the sludge composting facility.

(D) Distribution and Utilization of Class A Biosolids

This subrule applies to the distribution and utilization of Class A Biosolids. Any person proposing to distribute Class A Biosolids must operate under an Order of Approval.

(1) Packaged Distribution of Class A Biosolids

Packaged distribution shall mean Class A Biosolids which are sold or given away in a bag or other container for application to the land. The container shall hold no more than fifty (50) pounds of Class A Biosolids. The following information shall be provided by the distributor to the user on a label when Class A Biosolids is packaged:

(a) The name and address of the preparer of the product;
(b) A statement that the product is derived from sewage sludge;
(c) Instructions on the proper use of the product for various applications (for example, on lawns). This must include a statement that the annual product application rate should not be exceeded, if applicable;
(d) Class A Biosolids that are lead safe and are intended for use as a mulch must include a statement that the product is lead safe but not lead free.

(2) Unpackaged Distribution of Class A Biosolids

Unpackaged distribution shall mean Class A Biosolids that are sold or given away in bulk (not in a bag or container) for application to the land. Class A Biosolids that are sold or given away in a container holding more than fifty (50) pounds of Class A Biosolids shall be considered unpackaged distribution. The requirements for the distribution of unpackaged Class A Biosolids are based on volume as follows:

(a) Less Than Twenty-Five (25) Cubic Yards

Any distributor of Class A Biosolids must provide the following information, in writing, to all users taking less than twenty-five (25) cubic yards per day:

(i) The name and address of the preparer of the product;
(ii) A statement that the product is derived from sewage sludge;
(iii) Instructions on the proper use of the product for various applications (for example, on lawns). This must include a statement that the annual product application rate should not be exceeded, if applicable;
(iv) Class A Biosolids that are lead safe and are intended for use as a mulch must include a statement that the product is lead safe but not lead free.

(b) More Than Twenty-Five (25) Cubic Yards

Any distributor of Class A Biosolids must provide a "User's Guide" to all users taking more than twenty-five (25) cubic yards per day. The "User's Guide" shall be provided to the distributor by the Department and shall include instructions on the proper use of the product for various applications. The distributor must provide the instructions for the product to the Department so that they can be incorporated into the "User's Guide."

The distributor must maintain written records of the following information: date the Class A Biosolids was taken; name of user; amount of Class A Biosolids taken; location where Class A Biosolids are to be applied; and signature of the operator. The distributor must also indicate in the records that the user received a "User's Guide". Said records must be available for inspection by state and federal officials at all times.

(3) Class A Biosolids Storage

The storage of Class A Biosolids shall be allowed if the applicant can demonstrate, to the satisfaction of the Department, that the storage site will not impact surface water and groundwater.

(4) Odor Control

Any distribution site must comply with the Department's Office of Air Resources Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors.

(5) Transportation

All unpackaged Class A Biosolids shall be transported in vehicles which are properly covered while in transit so as to prevent any dropping of Class A Biosolids.

(6) Licensing

Any facility that produces Class A Biosolids must comply with the Department's Office of Natural Resource Services' Commercial Fertilizer Law, as amended, (RI Gen. Law Chap. 2-7) and any other rules and regulations

pertaining to fertilizer and soil amendment products. All fertilizer and soil amendment products must be registered with the Office of Natural Resource Services before being offered for sale.

(E) Agricultural Utilization of Class B Biosolids

This subrule applies to the utilization of Class B Biosolids as a fertilizer and/or soil amendment to enhance agricultural lands. Such uses may include, but are not limited to nurseries and tree farms, floriculture, and turfgrass production. All projects utilizing Class B Biosolids must operate under an Order of Approval and must meet the following requirements:

(1) Soil Analysis

Soil from the proposed land application site must be tested for metals listed in Appendix 8 and for the parameters listed in Rule 11(F) above. The Commissioner shall determine the testing and reporting frequency. All soil analyses shall be the responsibility of the applicant.

(2) Land Application Rates

All Class B Biosolids intended for agricultural utilization must be applied at an annual rate not to exceed the amount necessary to supply adequate available nitrogen for crop production using good agricultural practices or not to exceed the maximum annual rates recommended by the U.S. Department of Agriculture to achieve fertilizer benefits and soil improvement.

(3) Cumulative Loading Rates

The maximum amount of Class B Biosolids that can be applied to a land application site shall be calculated using the procedure established in Appendix 9. The amount of metals in the soil shall be deducted from each calculation.

(4) Crops

Food crops with harvested parts that touch the Class B Biosolids/soil mixture and are totally above the land surface shall not be harvested for fourteen (14) months after application of Class B Biosolids. Food crops with harvested parts below the surface of the land shall not be harvested for twenty (20) months after application of Class B Biosolids when the Class B Biosolids remains on the land surface for four (4) months or longer prior to incorporation into the soil. Food crops with harvested parts below the surface of the land shall not be harvested for thirty eight (38) months after application of Class B Biosolids when the Class B Biosolids remains on the land surface for less than four (4) months prior to incorporation into the soil. Food crops with harvested parts that do not touch the Class B Biosolids/soil mixture, feed crops and fiber crops shall not be harvested for thirty (30) days after application of Class B Biosolids. This requirement will be met if a land application site receives Class B Biosolids which meets the pathogen limits established in Appendix 7.

(5) Animal Grazing

Animals whose products are consumed by humans shall not be allowed to graze on land where Class B Biosolids are applied for thirty (30) days after the last application of Class B Biosolids has occurred. This requirement will be met if a land application site receives Class B Biosolids which meets the pathogen limits established in Appendix 7.

(6) Turf

Turf grown on land where Class B Biosolids is applied shall not be harvested for one (1) year after the last application of Class B Biosolids has passed when the harvested turf is placed on either land with a high potential

for public exposure or a lawn. This requirement will be met if a land application site receives Class B Biosolids which meets the pathogen limits established in Appendix 7.

(7) Public Access

Public access to land where Class B Biosolids has been applied shall be prohibited by the owner or operator until one (1) year has passed since the last application of Class B Biosolids to land with a high potential for public exposure, such as a park or ballfield or thirty (30) days has passed since the last application of Class B Biosolids to land with a low potential for public exposure, such as private farmland. This requirement will be met if a land application site receives Class B Biosolids which meets the pathogen limits established in Appendix 7.

(8) Frozen Ground

No Class B Biosolids shall be applied to frozen, flooded or snow-covered ground unless appropriate erosion and runoff control measures are provided.

(9) Odor Control

Any Class B Biosolids utilization project must comply with the Department's Office of Air Resources Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors.

(10) Groundwater

A minimum of two (2) feet of soil is required between the lowest level of Class B Biosolids and the highest water table level established during the seasonal high ground water table period determined by the Department in accordance with the Department's ISDS regulations. In addition, a minimum of three (3) feet of soil is required between the highest level of bedrock and the lowest level of applied Class B Biosolids.

(11) Surface Water

No Class B Biosolids shall be land applied within fifty (50) feet of any body of surface water or within one hundred (100) feet of any body of surface water within the watershed of a public drinking water supply. The Commissioner, may, if necessary, require continuous monitoring of any surface water courses in the vicinity of the proposed Class B Biosolids application site. Such monitoring shall be of a type and frequency determined by the Commissioner on a case-by-case basis and shall be the responsibility of the owner or operator. This requirement will be met if the applicant demonstrates to the satisfaction of the Department that any runoff from the proposed project will not affect surface water.

(12) Drinking Water Wells

No Class B Biosolids shall be land applied within fifty (50) feet of any private drinking water supply well or within four hundred (400) feet of any public drinking water supply well. Land application of Class B Biosolids shall be in accordance with the Rhode Island Groundwater Protection Act of 1985, General Laws Chapter 46-13.1 and any rules and regulations promulgated thereunder.

(13) Distance to Property Lines

No Class B Biosolids shall be land applied within fifty (50) feet of a property line. This requirement will be met if consent from the adjacent landowner is received.

(14) Monitoring Wells

Groundwater monitoring shall be of a type and frequency determined by the Commissioner on a case-by-case basis and shall be the responsibility of the owner or operator.

(15) Erosion Control

Soil erosion on all land application sites shall be limited to conditions which meet Resource Management System Quality Criteria for soil erosion as defined in the USDA Natural Resources Conservation Service (NRCS) Field Office Technical Guide for Rhode Island. Erosion control methods on all land application sites shall be consistent with practice standards and specifications in the NRCS Field Office Technical Guide for Rhode Island. Sediment and runoff shall be controlled on all land application sites consistent with the measures within the Rhode Island Erosion and Sediment Control Handbook, USDA, SCS, 1990.

(16) Transportation

All Class B Biosolids shall be transported in vehicles which are properly covered while in transit so as to prevent any dropping of Class B Biosolids.

(F) Non-Agricultural Utilization of Class B Biosolids

This subrule applies to utilization of Class B Biosolids as a fertilizer and/or soil amendment to enhance non-agricultural lands. Such uses may include, but are not limited to public parks and grounds, sand and gravel pit reclamation, roadsides and medians, silviculture, playgrounds, golf courses, ballfields and stadiums and cemeteries.

All projects utilizing Class B Biosolids must operate under an Order of Approval and must meet the following requirements:

(1) Cumulative Loading Rates

The maximum amount of Class B Biosolids that can be applied to a land application site shall be calculated using the procedure established in Appendix 9. All Class B Biosolids intended for land application must be applied using good agricultural or silvicultural practices.

(2) Public Access

Public access to land where Class B Biosolids is applied shall be prohibited by the owner or operator until one (1) year has passed since the last application of Class B Biosolids to land with a high potential for public exposure, such as a park or ballfield or thirty (30) days has passed since the last application of Class B Biosolids to land with a low potential for public exposure, such as a sand and gravel pit reclamation site. This requirement will be met if a land application site receives Class B Biosolids which meets the pathogen limits established in Appendix 7.

(3) Frozen Ground

No Class B Biosolids shall be applied to frozen, flooded or snow-covered ground unless appropriate erosion and runoff control measures are provided.

(4) Odor Control

Any Class B Biosolids utilization project must comply with the Department's Office of Air Resources Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors.

(5) Groundwater

A minimum of two (2) feet of soil is required between the lowest level of Class B Biosolids and the highest water table level established during the seasonal high ground water table period determined by the Department in

accordance with the Department's ISDS regulations. In addition, a minimum of three (3) feet of soil is required between the highest level of bedrock and the lowest level of applied Class B Biosolids.

(6) Surface Water

No Class B Biosolids shall be land applied within fifty (50) feet of any body of surface water or within one hundred (100) feet of any body of surface water within the watershed of a public drinking water supply. The Commissioner, may, if necessary, require continuous monitoring of any surface water courses in the vicinity of the proposed Class B Biosolids application site. Such monitoring shall be of a type and frequency determined by the Commissioner on a case-by-case basis and shall be the responsibility of the owner. This requirement will be met if the applicant demonstrates to the satisfaction of the Department that the proposed project will not affect surface water.

(7) Drinking Water Wells

No Class B Biosolids shall be land applied within fifty (50) feet of any private drinking water supply well or within four hundred (400) feet of any public drinking water supply well. Land application of Class B Biosolids shall be in accordance with the Rhode Island Groundwater Protection Act of 1985, General Laws Chapter 46-13.1 and any rules and regulations promulgated thereunder.

(8) Distance to Property Lines

No Class B Biosolids shall be land applied within fifty (50) feet of a property line. This requirement will be met if consent is received from the adjacent land owner.

(9) Monitoring Wells

Groundwater monitoring shall be of a type and frequency determined by the Commissioner on a case-by-case basis and shall be the responsibility of the owner or operator.

(10) Erosion Control

Soil erosion on all land application sites shall be limited to conditions which meet Resource Management System Quality Criteria for soil erosion as defined in the USDA Natural Resources Conservation Service (NRCS) Field Office Technical Guide for Rhode Island. Erosion control methods on all land application sites shall be consistent with practice standards and specifications in the NRCS Field Office Technical Guide for Rhode Island. Sediment and runoff shall be controlled on all land application sites consistent with the measures within the Rhode Island Erosion and Sediment Control Handbook, USDA, SCS, 1990.

(11) Transportation

All Class B Biosolids shall be transported in vehicles which are properly covered while in transit so as to prevent any dropping of Class B Biosolids.

(G) Utilization of Class C Biosolids

This subrule applies to the utilization of Class C Biosolids at solid waste landfills and land disposal sites. Utilization at solid waste landfills must be in accordance with the solid waste regulations. All solid waste landfills and land disposal sites utilizing Class C Biosolids must operate under an Order of Approval.

(1) Solid Waste Landfills

Solid waste landfill uses include the following:

(a) Daily Cover

Class C Biosolids may be utilized as initial or daily landfill cover only as an amendment in amounts to be approved on a case-by-case basis.

(b) Intermediate Cover

Class C Biosolids may be utilized as an amendment in the creation of a six-inch (6") intermediate cover over the initial cover layer.

(c) Final Cover

Class C Biosolids may be utilized as final landfill cover as an application of soil of sufficient type and thickness to support vegetative growth.

(2) Land Disposal Sites

Class C Biosolids may be utilized as final cover for land disposal sites as an application of soil of sufficient type and thickness to support vegetative growth.

(3) Application Rates

Class C Biosolids utilized as cover shall be applied at a rate determined on a case-by-case basis. Utilization at solid waste landfills shall be in accordance with procedures established in the solid waste regulations.

(4) Surface Water

Class C Biosolids utilized as cover shall not be applied within fifty (50) feet of any body of surface water. This requirement will be met if the applicant demonstrates to the satisfaction of the Department that any runoff from the project will not affect surface water.

(5) Odor Control

Any solid waste landfill or land disposal site utilizing Class C Biosolids must comply with the Department's Office of Air Resources' Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors.

(6) Transportation

All Class C Biosolids shall be transported in vehicles which are properly covered while in transit so as to prevent any dropping of Class C Biosolids.

## RULE 13. COMPOSTING OF SLUDGE - SUBMISSIONS FOR APPROVAL

(A) Sludge Composting Operations

Plans and submissions required by Rules 13(A)(2) - (5) below must be stamped by a registered professional engineer or land surveyor. The plans should be scaled to fit on a standard 24 x 36 inch sheet wherever possible. Larger sheets must be used when the minimum scale requirements do not permit the use of 24 x 36 inch sheets. The Commissioner may require additional information if necessary to satisfy the requirements of these rules and regulations.

(1) Initial Investigation Plans

Copies of the latest U.S. Geological Topographic Map, Farm Services Agency aerial maps and the United States Department of Agriculture Soil Survey Map, with the site outlined and an indication of the required setbacks, must be submitted to the Office of Water Resources prior to all other required information. This will allow initial evaluation of the plan relating to wetlands, aquifers, and soil type before large investigatory and developmental expenditures are made. A report of the evaluation shall be made to the applicant. The report shall list what submissions, if any, from Rules 13(A)(2) - (8) below must be submitted to the Office of Water Resources to obtain an Order of Approval.

(2) Radius Plan

A radius plan including all the information listed below shall be submitted. The radius plan must be drawn at a minimum scale of one inch to two hundred feet (1"=200') and include all areas within a one quarter (1/4) mile radius from all property lines of the site. The required information includes:

(a) All buildings;
(b) All water supplies (wells, etc.);
(c) All surface water courses and wetlands;
(d) All roads;
(e) All boring locations;
(f) Legal boundaries of site;
(g) North arrow;
(h) Extent of one hundred (100) year flood plain (where applicable), and
(I) Local zoning and permitting requirements.

(3) Site Plan

A site plan including all of the information listed below for all areas within the sludge composting site shall be submitted. The site plan must be drawn to a minimum scale of one inch to one hundred feet (1"=100'). The required information includes:

(a) Initial ground contours at five-foot intervals;
(b) Final proposed contours at five-foot intervals;
(c) Boring locations;
(d) Proposed leachate collection and treatment systems;
(e) Proposed gas controls (if any);
(f) Buildings (where applicable);
(g) Wells (if any);
(h) Surface water courses and other wetlands;
(I) Roads;
(j) Ground water monitoring wells;
(k) Legal boundaries of site;
(l) Power lines, pipe lines, rights of way and other utilities;
(m) Proposed fences;
(n) Weighing facilities (if any), and
(o) North arrow.

(4) Soil Borings

Borings shall be required of all proposed areas to be developed. The minimum number of borings required are listed below:

| Proposed No. of Acres to be Filled | No. of Borings |
|---|---|
| 1 - 10 | 3 |
| 11 - 50 | 6 |
| 51 - 100 | 12 |
| 101 - 200 | 18 |
| Over 200 | 24 plus 1 for every 10 acres over 200 |

Split spoon samples shall be collected at a minimum of five (5) foot intervals. A soil description shall be provided for each split spoon sample. All borings should be driven to a minimum depth of twenty (20) feet below the proposed bottom level of composted sludge or to refusal. The following information contained on the boring logs should be submitted:

(a) Depth of the maximum elevation of the groundwater table (to be measured at a minimum of twenty four (24) hours after the boring is taken);
(b) A detailed soil profile description to a depth of four (4) feet must be submitted for each soil mapping unit on the sludge composting site. The required information includes:

(i) Color of each horizon;
(ii) Texture of each horizon;
(iii) Depth of each horizon;
(iv) Depth to mottles (if any);
(v) Amount of coarse fragments (if any);
(vi) Depth to bedrock (if encountered);
(vii) Consistence or relative density, and
(viii) Slope.

(c) Method of boring;
(d) Blowcounts, and
(e) Date boring was taken.

The boring should be located to give the best indications of subsurface conditions for the whole sludge composting site that can be obtained considering the limited number of borings required. The groundwater table elevation determination shall be made when the water table is highest; this occurs usually during the months of January through April. (Specific dates may be determined on a yearly basis by the Commissioner.) All boring holes must be maintained for future water table elevation determinations. If the Commissioner feels it necessary, additional borings may be required.

(5) Groundwater Survey

A groundwater survey showing the maximum ground water elevations, the direction of groundwater flow, and an estimation of the rate of flow (including calculations) shall be submitted.

(6) Site Delineation

The following sludge composting site areas shall be marked with stakes at the time of the engineering survey. The stakes must be a minimum of two (2) feet high, clearly visible and maintained at all times. All sites shall include the following delineations:

(a) Areas enclosed by legal boundaries; and
(b) Areas to be developed as indicated in the Operating Plan.

(7) Operating Plan

An operating plan shall be submitted detailing procedures for a two-year period. No later than ninety (90) days prior to the end of this two-year period, a new operating plan shall be submitted which covers the following two (2) years. All operating plans shall include the following information:

(a) Detailed description of the sludge composting method to be used and the proposed sequence of operation (see Rule 12(A), "Sludge Composting Operations");
(b) Use of bulking agent and procedures for temperature control;
(c) Operating hours;
(d) Personnel and duties;
(e) Procedures to control dust, vectors and odors;
(f) Provisions for the immediate composting of all sludge;
(g) Provisions for the proper storage of composted sludge;
(h) Procedures to control erosion and sedimentation;
(I) Equipment to be on-site during operating hours;
(j) Substitute equipment available;
(k) Communications equipment available;
(l) Population and service area;
(m) Winter operations;
(n) Provisions for limiting access;
(o) Provisions for composted sludge utilization;
(p) Weighing facilities (if any);
(q) Estimated life of sludge composting facility;
(r) Aesthetic considerations;
(s) Leachate treatment operations, and
(t) Surface drainage control measures.

(8) Sludge and Bulking Agent Analysis

The results of the sludge and bulking agent analysis required in Rule 12(A)(9) of these rules and regulations must be on file with the Office of Water Resources at the time of application.

(9) Application for Order of Approval

Any person who proposes to operate a sludge composting facility must submit an Application for Order of Approval (see Appendix 1) as described in Rule 7 of these rules and regulations.

(10) Site Information Sheet

For all sludge composting sites, the applicant must submit a completed Site Information Sheet (see Appendix 2). The Site Information Sheet must be on file with the Office of Water Resources at the time of application.

(B) Distribution and Utilization of Class A Biosolids

This subrule applies to the distribution and utilization of Class A Biosolids as described in Rule 12(D) of these rules and regulations.

(1) Operating Plan

The applicant must submit an operating plan to the Office of Water Resources describing compliance with the provisions of Rule 12(D) of these rules and regulations. The operating plan must be on file with the Office of Water Resources at the time of application.

(2) Class A Biosolids Storage

At the time of application the distributor must submit a copy of the latest U.S. Geological Topographic Map with the distribution site outlined and an indication of the Class A Biosolids storage areas. This requirement will be met if the applicant proposes to store Class A Biosolids in an enclosed structure, where runoff will not occur.

(3) Composted Sludge Analysis

The results of the Class A Biosolids analysis required in Rule 12(C) of these rules and regulations must be on file with the Office of Water Resources at the time of the application.

(4) Application for Order of Approval

Any person who proposes to distribute Class A Biosolids must submit an Application for Order of Approval (see Appendix 1) as described in Rule 7 of these rules and regulations.

(5) Site Information Sheet

For all sites at which Class A Biosolids is to be distributed, the applicant must submit a completed Site Information Sheet (see Appendix 2). The Site Information Sheet must be on file with the Office of Water Resources at the time of application.

(C) Agricultural and Non-Agricultural Utilization of Class B Biosolids

This subrule applies to the utilization of Class B Biosolids as a fertilizer and/or soil amendment to enhance agricultural and non-agricultural lands as described in Rules 12(E) and 12(F). The plan required by Rule 13(C)(2) below must be stamped by a registered professional engineer or land surveyor. The plans should be scaled to fit on a standard 24 x 36 inch sheet wherever possible. Larger sheets must be used when the minimum scale requirements do not permit the use of 24 x 36 inch sheets. The Commissioner may require additional information if necessary to satisfy the requirements of these rules and regulations.

(1) Initial Investigation Plans

Copies of the latest U.S. Geological Topographic Map, Farm Services Agency aerial maps and the United States Department of Agriculture Soil Survey Map, with the site outlined and an indication of the required set-backs must be submitted to the Office of Water Resources prior to all other required information. This will allow initial evaluation of the plan relating to wetlands, aquifers, and soil type before large investigatory and developmental expenditures are made. A report of the evaluation shall be made to the applicant. The report shall list what submissions, if any, from Rules 13(C)(2) - (4) below must be submitted to the Office of Water Resources to obtain an Order of Approval.

(2) Radius Plan

A radius plan including all the information listed below shall be submitted. The radius plan must be drawn at a minimum scale of one inch to two hundred feet (1"=200') and include all areas within a one quarter (1/4) mile radius from all property lines of the site. The required information includes:

(a) All buildings;
(b) All water supplies (wells, etc.);
(c) All surface water courses and wetlands;
(d) All roads;
(e) Legal boundaries of site;

(f) North arrow;
(g) Extent of one hundred (100) year flood plain (where applicable), and
(h) Local zoning and permitting requirements.

(3) Operating Plan

An operating plan shall be submitted including all the information listed below:

(a) Detailed description of the Class B Biosolids utilization project and the proposed sequence of operation;
(b) Provisions for compliance with Rules 12(E) and 12(F) of these rules and regulations;
(c) Personnel and duties;
(d) Procedures to control dust;
(e) Procedures to control erosion, sedimentation and promote vegetative growth;
(f) Equipment to be utilized;
(g) Substitute equipment available;
(h) Provisions to control access;
(I) Estimated life of Class B Biosolids utilization area, and
(j) Aesthetic considerations.

(4) Class B Biosolids and Soil Analysis

The results of the Class B Biosolids analysis required in Rule 12(C) and the soil analysis required in Rule 12(E)(1) of these rules and regulations, must be on file with the Office of Water Resources at the time of application.

(5) Application for Order of Approval

Any person that proposes to land apply Class B Biosolids must submit an Application for Order of Approval (see Appendix 1) as described in Rule 7 of these rules and regulations.

(6) Site Information Sheet

For all sites on which Class B Biosolids is to be applied, the applicant must submit a completed Site Information Sheet (see Appendix 2). The Site Information Sheet must be on file with the Office of Water Resources at the time of application.

(D) Utilization of Class C Biosolids

This subrule applies to the utilization of Class C Biosolids at solid waste landfills and land disposal sites as described in Rule 12(G). In addition to items (1)-(4) below, all submissions for approval and amendments to solid waste landfill operating and/or closure plans utilizing Class C Biosolids for landfill cover must be approved by the Office of Waste Management, in accordance with the solid waste regulations.

(1) Operating Plan

Any owner or applicant who wishes to utilize Class C Biosolids at a solid waste landfill or land disposal site must submit an operating plan describing compliance with the requirements of this rule to the Commissioner to be reviewed and evaluated individually before approval is issued.

(2) Class C Biosolids Analysis

The results of the Class C Biosolids analysis required in Rule 12(C) of these rules and regulations, must be on file with the Office of Water Resources at the time of application.

(3) Application for Order of Approval

Any person that proposes to utilize Class C Biosolids at a solid waste landfill or land disposal site must submit an Application for Order of Approval (see Appendix 1) as described in Rule 7 of these rules and regulations.

(4) Site Information Sheet

For all solid waste landfill and land disposal sites where Class C Biosolids is to be applied, the applicant must submit a completed Site Information Sheet (see Appendix 2). The Site Information Sheet must be on file with the Office of Water Resources at the time of application.

## RULE 14. ALTERNATIVE SLUDGE TECHNOLOGIES

The treatment of sewage sludge by chemical, thermophilic or any other alternative methods shall be permitted if the owner meets the requirements presented in this rule. Any alternative sludge technology facility must operate under an Order of Approval.

(A) Operations

All methods of sludge treatment must meet one of the Processes to Further Reduce Pathogens as listed in Appendix 4 and must meet one of the vector attraction reduction requirements described in Appendix 5. Any alternative sludge technology facility must comply with the Department's Office of Air Resources' Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors. Any method of sludge treatment must meet the requirements established for sludge composting in Rules 12(A)(2-10) of these rules and regulations and the submission requirements in Rule 13(A) of these rules and regulations. The Commissioner reserves the right to require additional information if necessary.

(B) Treated Sludge Quality

Any treated sludge which meets the limits established in Appendix 7 shall be considered Class A Biosolids; the requirements and restrictions for the distribution and use of Class A Biosolids are listed in Rule 12(D) of these rules and regulations. Any treated sludge which meets the limits established in Appendix 8 shall be considered Class B Biosolids; the requirements and restrictions for the use of Class B Biosolids are listed in Rule 12(E) and 12(F) of these rules and regulations. Any treated sludge which does not meet the limits established in Appendices 7 and 8 shall be considered Class C Biosolids; the requirements and restrictions for the use of Class C Biosolids are listed in Rule 12(G) of these rules and regulations.

(C) Treated Sludge Analysis

Class A Biosolids must be tested for the metals and the pathogens listed in Appendix 7. Class B Biosolids and Class C Biosolids must be tested for the metals and the characteristics listed in Appendix 8. All results must be submitted to the Office of Water Resources. The Commissioner shall determine the testing and reporting frequency. All treated sludge analysis shall be the responsibility of the owner or operator of the sludge treatment facility.

(D) Distribution or Utilization of Treated Sludge

Any treated sludge intended for distribution or utilization is subject to the submission requirements established in Rules 13(B-D) of these rules and regulations.

(E) Licensing

Any facility that produces Class A Biosolids must comply with the Department's Office of Natural Resource Services' Commercial Fertilizer Law, as amended, (RI Gen. Law Chap. 2-7) and any other rules and regulations pertaining to

fertilizer and soil amendment products. All fertilizer and soil amendment products must be registered with the Office of Natural Resource Services before being offered for sale.

## RULE 15. INCINERATION

Incineration of sludge shall be permitted if the incinerator system employed complies with rules and regulations promulgated by the Department regarding incinerators, air pollution, and all other applicable provisions of the law and such rules and regulations.

(A) Incineration Methods

Sludge incineration may be practiced by, but not limited to, the methods described below. Any proposed sludge incineration method must consider the treatment of exhaust gases to exclude harmful organics and particulates as stated in EPA and Rhode Island Air Pollution Control Regulations. Any comparable method of sludge incineration shall be considered by the Commissioner for approval.

(1) Multiple Hearth Incineration which includes, but is not limited to, "excess air" and pyrolysis.

(2) Fluidized Bed Reactors which include, but are not limited to, typical graded silica sand beds for the incineration of sludge.

(3) Cyclonic Reactors which include, but are not limited to, oil burning, atomizing type reactors.

(B) Operating Plan

Any owner or applicant who wishes to engage in sludge incineration must submit an incineration plan describing compliance with the requirements of this rule to the Commissioner to be reviewed and evaluated individually before approval is issued.

(C) Sludge Analysis

All sludge intended for incineration may be required to be tested using the Toxicity Characteristic Leaching Procedure for the parameters listed in Appendix 6 and the results submitted to the Office of Water Resources. The Commissioner shall determine the testing and reporting frequency. All sludge analyses shall be the responsibility of the owner of the facility that produced the sludge.

(D) Condition of Sludge

All sludge intended for incineration shall not meet the criteria for hazardous waste.

(E) Application for Order of Approval

Any person that proposes to incinerate sludge must submit an Application for Order of Approval (see Appendix 1) as described in Rule 7 of these rules and regulations.

(F) Odor Control

Any sludge incinerator must comply with the Department's Office of Air Resources' Air Pollution Control Regulation 17, as amended, or other rules and regulations pertaining to odors.

(G) Transportation

All sludge shall be transported in vehicles which are properly sealed, watertight and covered while in transit so as to prevent any leaking or dropping of sludge.

## RULE 16. CO-DISPOSAL OF SLUDGE AND SOLID WASTE

This rule applies to the disposal of sludge, composted sludge or treated sludge by burial at a solid waste landfill approved for the disposal of solid waste by the Department. Any such solid waste landfill must operate under an Order of Approval.

(A) Operating Plan

Any owner or applicant who wishes to engage in the disposal of sludge, composted sludge or treated sludge by burial at a solid waste landfill must submit a plan describing compliance with the requirements in this rule to the Commissioner to be reviewed and evaluated individually before approval is issued.

(B) Sludge Analysis

All sludge, composted sludge or treated sludge intended for disposal at a solid waste landfill may be required to be tested using the Toxicity Characteristic Leaching Procedure for the parameters listed in Appendix 6 and the results submitted to the Office of Water Resources. The owner or operator of the facility that produced the sludge, composted sludge or treated sludge shall be responsible for all analyses. The Commissioner shall determine the testing and reporting frequency.

(C) Condition of Sludge, Composted Sludge or Treated Sludge

All sludge, composted sludge or treated sludge intended for disposal at a solid waste landfill shall be treated by one of the Processes to Significantly Reduce Pathogens described in Appendix 3. Such treatment shall be the responsibility of the owner or operator of the facility that produced the sludge, composted sludge or treated sludge. All sludge, composted sludge or treated sludge intended for disposal at a solid waste landfill shall not meet the criteria for hazardous waste.

(D) Cover Material

A soil cover of at least six (6) inches shall be applied to all sludge, composted sludge or treated sludge deposits daily to control disease vectors and nuisance conditions.

(E) Transportation

All sludge, composted sludge or treated sludge shall be transported in vehicles which are properly sealed, watertight and covered while in transit so as to prevent any leaking or dropping of sludge, composted sludge or treated sludge.

(F) Odor Control

Any such solid waste landfill site must comply with the Rhode Island Department of Environmental Management, Office of Air Resources Air Pollution Control Regulation 17, as amended, and other rules and regulations pertaining to odors.

(G) Application for Order of Approval

Any person that proposes to engage in the disposal of sludge, composted sludge or treated sludge by burial at a solid waste landfill must submit an Application for Order of Approval (see Appendix 1) as described in Rule 7 of these rules and regulations.

## RULE 17. OCEAN DISPOSAL

The discharge or disposal of sludge, composted sludge or treated sludge into the waters of the State is prohibited in accordance with Rhode Island General Laws, Title 46, Chapter 12, as amended.

## RULE 18. NOTIFICATION OF CLOSURE AND CLOSURE PROCEDURE

(A) Land Disposal Facilities or Sites

The owner of a land disposal site shall notify the Office of Water Resources in writing within ninety (90) days prior to the date the owner intends to close said site. The notification shall provide that the owner will physically remove all materials on site or the owner will abide by the closure plan, including the post-closure monitoring and financial provisions, as submitted by the applicant and approved by the Office of Water Resources under Rule 9(I) of these rules and regulations.

(B) Other Facilities or Sites

The owner of any facility or site other than a land disposal site shall notify the Office of Water Resources in writing at least thirty (30) days prior to the date the owner intends to close said facility or site. Before a facility or site will be considered closed, the Office of Water Resources shall conduct a final investigation to determine compliance with the provisions of these rules and regulations and the approved operating plan.

## RULE 19. LIMITED ACCESS

Operations of a facility or site shall be limited to those hours specified in the approved operating plan.

## RULE 20. EXISTING FACILITIES OR SITES

(A) All facilities or sites which are operating on the effective date of these rules and regulations (the "existing facilities") may continue to operate in compliance with their current Orders of Approval which shall remain in full force and effect unless suspended or revoked by the Commissioner in accordance with Rule 22 of these rules and regulations.

(B) All existing facilities shall apply for the issuance of an Order of Approval, in compliance with these rules and regulations, within six (6) months of the effective date of these rules and regulations unless required to do so earlier due to the suspension or revocation of its Order of Approval or the modification of operation of the subject facility or site.

## RULE 21. VARIANCES

(A) Any owner or applicant may submit a written request to the Commissioner for a variance from some or all provisions of these rules and regulations.

(B) The owner or applicant shall have the burden of proving by clear and convincing evidence that a variance should be granted because alternative design or operating standards or alternative methods proposed in the variance application fulfill the purposes of the rules and regulations from which the variance is requested and shall have no adverse effect on public health and the environment.

(C) Notice of the Commissioner's initiation of proceedings to review a request for a variance shall be provided by the applicant to all potentially affected parties as determined by the Commissioner. At a minimum, the applicant shall notify all owners of land abutting the site of the proposed activity. The Commissioner shall schedule a public hearing as required pursuant to Rhode Island General Laws Chapter 42-35 to solicit public comment prior to rendering a decision on the variance request. The applicant shall be required to pay the expenses for notice and hearing.

(D) The Commissioner's decision to grant or deny a variance shall be in writing and may, as a condition of granting the variance, impose appropriate requirements necessary to protect the public health and environment.

(E) Issuance of a variance pursuant to this rule does not relieve the holder of the variance from complying with requirements of these rules and regulations which have not been the subject of a variance.

**RULE 22. DENIAL, SUSPENSION, REVOCATION OF APPROVAL**

(A) The Commissioner may suspend or revoke, in whole or in part, an approval for cause, including, but not limited to:

(1) Failure to comply with these rules and regulations;

(2) Refusal to permit a reasonable inspection;

(3) Information indicating that the facility or site may result in probable harm to the environment or pose a threat to the health, safety and/or welfare of the public;

(4) The information on the Application for Order of Approval or in any other material in support of the application is found to be false, misleading, or erroneous; or

(5) Failure to comply with any conditions or provisions of the Order of Approval.

(B) Whenever the Commissioner determines that a facility or site is not being operated in conformance with these rules and regulations or the Order of Approval, the Commissioner may order the owner to take appropriate corrective action necessary to secure compliance with these rules and regulations and to order closure of said facility or site.

(C) The Commissioner may deny an application for failure to satisfy the requirements of these rules and regulations.

(D) A notice of suspension or revocation of an approval or the denial of an application shall be in the form of a letter notifying the owner or operator of the facility or site or subsequent transferee of the suspension, revocation, or denial and the reasons for the suspension, revocation, or denial.

(E) Any person served with a notice of suspension or revocation of an approval or the denial of an application may request an adjudicatory hearing to contest the suspension, revocation or denial as set forth in Rule 24 of these rules and regulations. A notice of suspension, revocation or denial automatically becomes a final order of the Commissioner enforceable in Superior Court upon failure to file a timely request for said adjudicatory hearing (as described in Rule 24).

**RULE 23. PENALTIES**

Penalties may be assessed in accordance with Rhode Island General Laws Chapters 46-12, 23-18.9, 23-19.1, 42-17.1, 42-17.6 and the Department's "Regulations for the Assessment of Administrative Penalties" for any violation of these rules and regulations.

**RULE 24. APPEALS**

(A) General

The procedures for appeal of Departmental decisions pursuant to the provisions of Section 42-35 of the R.I. General Laws are contained in both "Administrative Rules of Practice and Procedure for the Department of Environmental Management Administrative Adjudication Division for Environmental Matters" and the "Administrative Rules of Practice & Procedure for the Department of Environmental Management."

(B) Appeal Procedure for Approval Denials

Any person whose approval application is denied may appeal to the Director for review of the decision on which the denial is based by filing an appeal with DEM/Administrative Adjudication.

(1) Filing of Appeal

All appeals shall be in writing and shall be filed with and received by DEM/Administrative Adjudication within thirty (30) days after the effective date of the denial of the subject application.

(2) Contents of Appeal

Every appeal shall contain a detailed basis upon which the appeal is taken.

(3) Notice of Administrative Hearing

Upon the filing of an appeal with DEM/Administrative Adjudication, and once the hearing schedule allows, DEM/Administrative Adjudication shall notify by first class mail those persons as determined by the Commissioner pursuant to Rule 7(E) of the date, time and place of the adjudicatory hearing, in conformance with R.I. General Laws Section 42-35-9, as amended.

(C) Appeal Procedure for Notice of Violations

Any person who has received a Notice of Violation (NOV) alleging violation of these Regulations, may appeal to the Commissioner for review of the decision on which the NOV is based by filing an appeal with DEM/Administrative Adjudication.

(1) Filing of Appeal

All appeals shall be in writing and shall be filed with and received by DEM/Administrative Adjudication within ten (10) days after the date of receipt of the subject NOV.

(2) Contents of Appeal

Every appeal shall contain a detailed basis upon which the appeal is taken.

## RULE 25. SEVERABILITY

If any provision of these rules and regulations, or the application thereof to any person or circumstances, is held invalid by a court of competent jurisdiction, the validity of the remainder of the rules and regulations shall not be affected thereby.

## RULE 26. SUPERSEDED RULES AND REGULATIONS

On the effective date of these rules and regulations, all previous rules and regulations, and any policies regarding the administration and enforcement of sewage sludge treatment, disposal, utilization and transportation shall be superseded. However, any enforcement action taken by, or application submitted to, the Department prior to the effective date of these rules and regulations shall be governed by the rules and regulations in effect at the time the enforcement action was taken, or application filed.

**RULE 27. EFFECTIVE DATE**

The foregoing "Rules and Regulations for the Treatment, Disposal, Utilization, and Transportation of Sewage Sludge", after due notice, are hereby adopted and filed with the Secretary of State this _____ day of _____, 19__, to become effective twenty (20) days thereafter, in accordance with the provisions of Chapters 46-12, 42-17.1, 42-35, 23-18.9 and 23-19.1 of the General Laws of Rhode Island of 1956, as amended.

_____

Frederick J. Vincent, Acting Commissioner
Department of Environmental Management

Notice Given On: October 16, 1996

Public Hearing Held: Not Applicable

Filing Date:

Effective Date:

**APPENDIX 1**

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES

# APPLICATION FOR ORDER OF APPROVAL

THIS SECTION TO BE COMPLETED BY THE PREPARER

Name of Preparer_____ Contact Person _____

Address _____ City _____ State _____ Phone _____

Type of Material _____

Amount _____ Frequency of Disposal _____

Specific Method and Routing of Material _____

Material Analysis Performed By: _____

I, _____, hereby state that I have been authorized by the above-mentioned preparer or agent of the preparer to sign this document and declare that the information in this section is true and correct.

Signature _____ Date _____

THIS SECTION TO BE COMPLETED BY THE TRANSPORTER

Name of Transporter _____ Contact Person _____

Address _____ City _____ State _____ Phone _____

I, _____, hereby state that I have been authorized by the above-mentioned transporter or agent of the transporter to sign this document and declare that the material described above by the preparer will be transported in the method and routing described above.

Signature _____ Date _____

THIS SECTION TO BE COMPLETED BY THE OWNER OF THE FACILITY OR SITE

Name of Owner _____ Contact Person _____

Address _____ City _____ State _____ Phone _____

I, _____, hereby state that I have been authorized by the owner of the above-mentioned facility or site or the agent of the facility or site to sign this document and declare that the material described above will be disposed, distributed or utilized in the manner set forward in the application.

Signature _____ Date _____

**APPENDIX 2**

**SITE INFORMATION SHEET**

APPLICATION INFORMATION

Name of Applicant _____ Date _____

Mailing Address _____

_____

_____

Telephone Number _____

SITE INFORMATION

Owner of Site _____

Location of Site _____

Size of Site _____

Proximity of Site to: Surface Water _____ Buildings _____ Drinking Water Wells _____

Average Depth to Groundwater on Site _____

Average Slope of Land on Site _____

Name of Publicly or Privately Owned Treatment Works
Furnishing Sludge, Composted Sludge or Treated Sludge _____

Describe Use(s) of Sludge, Composted Sludge or Treated Sludge (e.g. Agriculture, Landfill Cover, etc.)

_____

_____

_____

_____

ADDITIONAL INFORMATION
(Please Attach the Following)

- TCLP Results for Sludge, Composted Sludge or Treated Sludge, if applicable (see Appendix 6)
- Sludge, Composted Sludge or Treated Sludge Analysis (see Appendix 7 and Appendix 8)
- USGS Map of Site Indicating Storage Areas, if applying to distribute Class A Biosolids

## APPENDIX 3

## PROCESSES TO SIGNIFICANTLY REDUCE PATHOGENS

(A) Aerobic Digestion

The process is conducted by agitating sludge with air or oxygen to maintain aerobic conditions at residence times ranging from 60 days at 15°C to 40 days at 20°C.

(B) Air Drying

Sludge is dried on sand beds or on paved or unpaved basins. A minimum of three months is needed, two months of which temperatures average on a daily basis above 0°C.

(C) Anaerobic Digestion

The process is conducted in the absence of air at residence times ranging from 60 days at 20°C to 15 days at 35°C to 55°C.

(D) Composting

Either the within-vessel, static aerated pile or windrow composting method is used to maintain the temperature of the sludge at 40°C or higher for 5 days. For 4 hours during the 5-day period, the temperature in the compost pile exceeds 55°C.

(E) Lime Stabilization

Sufficient lime is added to the sludge to produce a pH of 12 after 2 hours of contact. pH measurements shall be performed at 25°C or corrected to 25°C.

(F) Other Methods

Other methods or operating conditions, if accepted by the U.S. Environmental Protection Agency, may be utilized if pathogens are reduced to an extent equivalent to the reduction achieved by any of the above methods.

## APPENDIX 4

## PROCESSES TO FURTHER REDUCE PATHOGENS

(A) Composting

Using either the within-vessel composting method or the static aerated pile composting method, the temperature of the sewage sludge is maintained at 55°C or greater for three days. Using the windrow composting method, the temperature of the sewage sludge is maintained at 55°C or greater for at least 15 days. During the period when the compost is maintained at 55°C or greater, there shall be a minimum of five turnings of the windrow.

(B) Heat Drying

Sewage sludge is dried by direct or indirect contact with hot gases to reduce the moisture content of the sewage sludge to 10 percent or lower. Either the temperature of the sewage sludge particles exceed 80°C or the wet bulb temperature of the gas in contact with the sludge at the point where it leaves the dryer exceeds 80°C.

(C) Heat Treatment

Liquid sludge is heated to a temperature of 180°C or higher for 30 minutes.

(D) Thermophilic Aerobic Digestion

Liquid sludge is agitated with air or oxygen to maintain aerobic conditions at residence times of 10 days at 55°C to 60°C.

(E) Beta Ray Irradiation

Sludge is irradiated with beta rays from an accelerator at dosages of at least 1.0 megarad at room temperature (ca.20°C).

(F) Gamma Ray Irradiation

Sludge is irradiated with gamma rays from certain isotopes, such as Cobalt 60 and Cesium 137 at room temperature (ca.20°C).

(G) Pasteurization

Sludge is maintained at a minimum temperature of 70°C for at least 30 minutes.

(H) Other Methods

Other methods or operating conditions if acceptable by the U.S. Environmental Protection Agency may be utilized if pathogens are reduced to an extent equivalent to the reduction achieved by any of the above methods.

## APPENDIX 5

## VECTOR ATTRACTION REDUCTION REQUIREMENTS

(A) Reduction in Volatile Solids Content

The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38 percent (see calculation procedures in "Environmental Regulations and Technology--Control of Pathogens and Vector Attraction in Sewage Sludge", EPA-625/R-92/013, 1992, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268).

(B) Additional Digestion of Anaerobically Digested Biosolids

When the 38 percent volatile solids reduction requirement in option A cannot be met for an anaerobically digested sewage sludge, vector attraction reduction can be demonstrated by digesting a portion of the previously digested sewage sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30°C and 37°C. When at the end of the 40 days, the volatile solids in the sewage sludge at the beginning of that period is reduced by less than 17 percent, vector attraction reduction is achieved.

(C) Additional Digestion of Aerobically Digested Biosolids

When the 38 percent volatile solids reduction requirement in option A cannot be met for an aerobically digested sewage sludge, vector attraction reduction can be demonstrated by digesting a portion of the previously digested sewage sludge that has a percent solids of 2 percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20°C. When at the end of the 30 days, the volatile solids in the sewage sludge at the beginning of that period is reduced by less than 15 percent, vector attraction reduction is achieved.

(D) Specific Oxygen Uptake Rate (SOUR) for Aerobically Digested Biosolids

The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20°C.

(E) Aerobic Processes at Greater Than 40°C

Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40°C and the average temperature of the sewage sludge shall be higher than 45°C.

(F) Addition of Alkaline Material

The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours. pH measurements shall be performed at 25°C or corrected to 25°C.

(G) Moisture Reduction of Biosolids Containing No Unstabilized Solids

Sewage sludge shall not contain unstabilized solids generated during primary treatment and the solids content of the sewage sludge shall be at least 75 percent before the sewage sludge is mixed with other materials. The solids content of the sewage sludge shall be achieved by removing water, not by adding inert materials.

(H) Moisture Reduction of Biosolids Containing Unstabilized Solids

Solids content of the sewage sludge shall be at least 90 percent, regardless of whether the sewage sludge is from primary treatment. The solids content of the sewage sludge shall be achieved by removing water, not by adding inert materials.

The sewage sludge shall not be exposed to high humidity prior to use or disposal to prevent the outer surface of the sewage sludge from gaining moisture content.

(I) Biosolids Injection

(1) Sewage sludge shall be injected below the surface of the land, and
(2) No significant amount of the sewage sludge shall be present on the land surface within 1 hour after the sewage sludge is injected, and
(3) When the sewage sludge that is injected below the surface of the land meets the pathogen limits in Appendix 7, the sewage sludge shall be injected below the land surface within 8 hours after being discharged from the pathogen reduction process.

(J) Incorporation of Biosolids into the Soil

(1) Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within 6 hours after application to or placement on the land, and

(2) When sewage sludge that is incorporated into the soil meets the pathogen limits in Appendix 7, the sewage sludge shall be applied to or placed on the land within 8 hours after being discharged from the pathogen reduction process.

## APPENDIX 6

## MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC LEACHATE PROCEDURE

| EPA Hazardous Waste Number | Contaminant | Regulatory Limit (mg/L) |
|---|---|---|
| D004 | Arsenic | 5.0 |
| D005 | Barium | 100.0 |
| D018 | Benzene | 0.5 |
| D006 | Cadmium | 1.0 |
| D019 | Carbon tetrachloride | 0.5 |
| D020 | Chlordane | 0.03 |
| D021 | Chlorobenzene | 100.0 |
| D022 | Chloroform | 6.0 |
| D007 | Chromium | 5.0 |
| D023 | o-Cresol | 200.0 |
| D024 | m-Cresol | 200.0 |
| D025 | p-Cresol | 200.0 |
| D026 | Cresol | 200.0 |
| D016 | 2,4-D | 10.0 |
| D027 | 1,4-Dichlorobenzene | 7.5 |
| D028 | 1,2-Dichloroethane | 0.5 |
| D029 | 1,1-Dichloroethylene | 0.7 |
| D030 | 2,4-Dinitrotoluene | 0.13 |
| D012 | Endrin | 0.02 |
| D031 | Heptachlor (and its hydroxide) | 0.008 |
| D032 | Hexachlorobenzene | 0.13 |
| D033 | Hexachlorobutadiene | 0.5 |
| D034 | Hexachloroethane | 3.0 |
| D008 | Lead | 5.0 |
| D013 | Lindane | 0.4 |
| D009 | Mercury | 0.2 |
| D014 | Methoxychlor | 10.0 |
| D035 | Methyl ethyl ketone | 200.0 |
| D036 | Nitrobenzene | 2.0 |
| D037 | Pentachlorophenol | 100.0 |
| D038 | Pyridine | 5.0 |
| D010 | Selenium | 1.0 |
| D011 | Silver | 5.0 |
| D039 | Tetrachloroethylene | 0.7 |
| D015 | Toxaphene | 0.5 |
| D040 | Trichloroethylene | 0.5 |
| D041 | 2,4,5-Trichlorophenol | 400.0 |
| D042 | 2,4,6-Trichlorophenol | 2.0 |
| D017 | 2,4,5-TP (Silvex) | 1.0 |
| D043 | Vinyl chloride | 0.2 |

## APPENDIX 7

## CLASS A BIOSOLIDS LIMITS

(A) Metals

| METAL | LIMIT, mg/kg (dry weight) |
|---|---|
| Arsenic | 41 |
| Cadmium | 39 |
| Chromium | 1200 |
| Copper | 1500 |
| Lead | 300 |
| Mercury | 17 |
| Molybdenum | 75 |
| Nickel | 420 |
| Selenium | 36 |
| Zinc | 2800 |

(B) Pathogens

The following pathogen limit must be met:

| PATHOGEN | LIMIT |
|---|---|
| Fecal Coliform Bacteria | Less than 1000 Most Probable Number per 1 gram of total solids (dry weight) |

Pathogen reduction must take place before or at the same time as vector attraction reduction except when options F through J in Appendix 5 are used.

## APPENDIX 8

## CLASS B BIOSOLIDS LIMITS

(A) Metals

| METAL | LIMIT, mg/kg (dry weight) |
|---|---|
| Arsenic | 75 |
| Cadmium | 85 |
| Chromium | 3000 |
| Copper | 4300 |
| Lead | 840 |
| Mercury | 57 |
| Molybdenum | 75 |
| Nickel | 420 |
| Selenium | 100 |
| Zinc | 7500 |

(B) Characteristics

| CHARACTERISTICS |
|---|
| Ratio of Sludge to Bulking Agent (if applicable) |
| Density of Composted Sludge (if applicable) |
| Moisture Content (%) |
| Total Volatile Solids (%) |
| Ammonia Nitrogen (%) |
| Nitrate Nitrogen (%) |
| Total Nitrogen (%) |
| Available Phosphoric Acid (%) |
| Soluble Potash (%) |
| Specific Conductivity |
| pH |

## APPENDIX 9

## MAXIMUM CUMULATIVE LOADING RATES

| METAL | DRY TONS PER ACRE |
|---|---|
| Arsenic | $\frac{41 \text{ kg As/hectare}}{(\_\_\text{ppm As}) \times 0.002}$ |
| Cadmium | $\frac{39 \text{ kg Cd/hectare}}{(\_\_\text{ppm Cd}) \times 0.002}$ |
| Chromium | $\frac{3000 \text{ kg Cr/hectare}}{(\_\_\text{ppm Cr}) \times 0.002}$ |
| Copper | $\frac{1500 \text{ kg Cu/hectare}}{(\_\_\text{ppm Cu}) \times 0.002}$ |
| Lead | $\frac{300 \text{ kg Pb/hectare}}{(\_\_\text{ppm Pb}) \times 0.002}$ |
| Mercury | $\frac{17 \text{ kg Hg/hectare}}{(\_\_\text{ppm Hg}) \times 0.002}$ |
| Nickel | $\frac{420 \text{ kg Ni/hectare}}{(\_\_\text{ppm Ni}) \times 0.002}$ |
| Selenium | $\frac{100 \text{ kg Se/hectare}}{(\_\_\text{ppm Se}) \times 0.002}$ |
| Zinc | $\frac{2800 \text{ kg Zn/hectare}}{(\_\_\text{ppm Zn}) \times 0.002}$ |

The parts per million of each metal are provided in the sludge, composted sludge or treated sludge analyses.

The lowest value is chosen from the above nine (9) calculations as the maximum cumulative tons of sludge, composted or treated sludge which can be applied per acre.