

**DEPARTMENT OF ENVIRONMENTAL QUALITY**

**SURFACE WATER QUALITY DIVISION**

**WATER RESOURCES PROTECTION**

(By authority conferred on the department of environmental quality by sections 3104 and 3106 of Act No.451 of the Public Acts of 1994, as amended, being §§324.3104 and 324.3106 of the Michigan Compiled Laws)

**PART 24. LAND APPLICATION OF BIOSOLIDS**

**R 323.2401 Purpose and applicability.**

Rule 2401. (1) These rules establish standards for the land application and beneficial recycling of biosolids originating from domestic sewage treatment systems and sanitary sewage treatment systems. The standards consist of general requirements, notification, recordkeeping, pollutant limits, management practices, and operational standards.

(2) These rules apply to all of the following:

- (a) Any person who prepares or applies biosolids to the land.
- (b) Biosolids applied to the land.
- (c) The land where biosolids are applied.

History: 1999 AACCS.

**R 323.2402 Definitions.**

Rule 2402. (1) As used in these rules:

(a) "Act" means Act No. 451 of the Public Acts of 1994, as amended, being §324.101 et seq. of the Michigan Compiled Laws.

(b) "Aerobic digestion" means the biochemical decomposition of organic matter in biosolids into carbon dioxide and water by microorganisms in the presence of air.

(c) "Agricultural land" means land on which a food crop, a feed crop, or a fiber crop is grown. The term includes range land and land used as pasture.

(d) "Agronomic rate" means the calculated biosolids application rate (dry weight basis) which provides the amount of plant-available nitrogen (PAN) needed by the crop or vegetation grown on the land; which minimizes the amount of nitrogen that passes below the root zone of the crop or vegetation grown; and which considers the amounts of phosphate (P<sub>2</sub>O<sub>5</sub>) and potash (K<sub>2</sub>O) added by the biosolids as part of the total nutrient management plan.

(e) "Anaerobic digestion" means the biochemical decomposition of organic matter in biosolids into methane gas and carbon dioxide by microorganisms in the absence of air.

(f) "Annual pollutant loading rate" means the maximum amount of a pollutant in biosolids that can be applied to a unit area of land during a 365-day period.

(g) "Annual whole biosolids application rate" means the maximum amount of biosolids (dry weight basis) that can be applied to a unit area of land during a 365-day period.

(h) "Biosolids" means solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. The term "biosolids" includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

(i) "Bulk biosolids" means biosolids that are not sold or given away in a bag or other container for application to a lawn or home garden.

(j) "Class A" means biosolids that meet the requirement in R 323.2414(2)(b) and the requirements in R 323.2414(2)(c), (d), (e), (f), (g), or (h) with respect to pathogens.

(k) "Class B" means biosolids that meet the requirements in R 323.2414(3)(c), (d), or (e) with respect to pathogens.

(l) "Cumulative pollutant loading rate" means the maximum amount of an inorganic pollutant that can be applied to an area of land.

(m) "Department" means the director of the department of environmental quality or his or her designee.

(n) "Derivative" means a product for land application derived from biosolids that does not include solid waste or other waste regulated under the act. A derivative does not include materials or treatment chemicals, that is, lime or ferric chloride, integral to wastewater treatment and biosolids unit processes.

(o) "Detroit consumer price index" means the most comprehensive index of consumer prices available for the Detroit area from the United States department of labor, bureau of labor statistics.

(p) "Distributor" means a person who applies, markets, or distributes, except at retail, a derivative.

(q) "Domestic sewage" means waste and wastewater from humans or household operations that is discharged to, or otherwise enters, a treatment works.

(r) "Dry weight basis" means calculated on the basis of having been dried at 105 degrees Celsius until reaching a constant mass that is essentially 100% solids content.

(s) "EPA" means the United States environmental protection agency.

(t) "Exceptional quality" or "EQ" means biosolids or a derivative that meets all of the following criteria:

(i) Pollutant ceiling concentrations in R 323.2409(5)(a).

(ii) Pollutant concentrations in R 323.2409(5)(c).

(iii) One of the vector attraction reduction options in R 323.2415(4)(a) to (h) and 1 of the class A pathogen reduction alternatives in R 323.2414(2)(a).

(u) "Feed crops" means crops produced primarily for consumption by animals.

(v) "Fiber crops" means crops such as flax and cotton.

(w) "Food crops" means crops consumed by humans. The term includes, but is not limited to, fruits, vegetables, and tobacco.

(x) "Forest" means a tract of land that is thick with trees and underbrush.

(y) "Generator" means a person who generates biosolids that are applied to land.

(z) "Groundwater" means water below the land surface in the saturated zone.

(aa) "Incorporation" means the blending of surface-applied biosolids into the soil so that a significant amount of the biosolids is not present on the land surface within 1 hour after blending.

(bb) "Injection" means the placement of biosolids below the land surface so that a significant amount of the biosolids is not present on the land surface within 1 hour after land application.

(cc) "Land application" means spraying or spreading biosolids onto the land surface, injecting biosolids below the land surface, or incorporating biosolids into the soil so that the biosolids can either condition the soil or fertilize crops or vegetation grown in the soil.

(dd) "Land application plan" means the process a generator uses to identify and select land application sites that are not included in a land application site list. At a minimum a plan shall include all of the following:

(i) A description of the geographical area covered by the plan.

(ii) Identification of the criteria used for site selection.

(iii) A description of how the sites are managed.

(ee) "Land with a low potential for public exposure" means land that the public uses infrequently. The term includes, but is not limited to, agricultural land, a forest, and a reclamation site located in an unpopulated area, for example, a strip mine located in a rural area.

(ff) "Land with a high potential for public exposure" means land that the public uses frequently. The term includes, but is not limited to, a public contact site and a reclamation site located in a populated area, for example, a construction site located in a city.

(gg) "Listed land application site" means a site which has been approved by the department and is used for biosolids land application by a generator.

(hh) "Local unit" means a county, city, village, or township or an agency or instrumentality of these entities.

(ii) "Other container" means either an open or closed receptacle. The term includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer that has a load capacity of 1 metric ton or less.

(jj) "Pasture" means land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.

(kk) "Pathogenic organisms" means disease-causing organisms. The term includes, but is not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

(ll) "Permit" means 1 of the following:

(i) A national pollutant discharge elimination system (NPDES) permit that is issued by the department under section 3112(1) of the act to control wastewater discharges to the surface waters and to manage biosolids.

(ii) A permit that is issued by the department under section 3112(1) of the act to control wastewater discharges to the groundwaters and to manage biosolids.

(iii) A biosolids permit issued by the department.

(mm) "Permitting authority" means the department.

(nn) "Person" means an individual, association, partnership, corporation, local unit, state or federal agency, or an agent or employee of any of the entities specified in this definition.

(oo) "Person who prepares biosolids" means either the person who generates biosolids during the treatment of domestic sewage or sanitary sewage in a treatment works or the person who derives a material from biosolids.

(pp) "pH" means the logarithm of the reciprocal of the hydrogen ion concentration measured at 25 degrees Celsius or measured at another temperature and then converted to an equivalent value at 25 degrees Celsius.

(qq) "Pollutant" means an organic substance, an inorganic substance, a combination of organic and inorganic substances, or a pathogenic organism that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food chain, could, on the basis of information available to the administrator of EPA or the department, cause any of the following in either organisms or offspring of the organisms:

- (i) Death.
- (ii) Disease.
- (iii) Behavioral abnormalities.
- (iv) Cancer.
- (v) Genetic mutations.
- (vi) Physiological malfunctions, including malfunction in reproduction.
- (vii) Physical deformations.

(rr) "Pollutant limit" means a numerical value that describes the amount of a pollutant allowed per unit amount of biosolids, for example milligrams per kilogram of total solids; the amount of a pollutant that can be applied to a unit area of land, for example, kilograms per hectare or pounds per acre; or the volume of a material that can be applied to a unit area of land, for example, gallons per acre.

(ss) "Public contact site" means land that has a high potential for contact by the public. The term includes, but is not limited to, any of the following:

- (i) Public parks.
- (ii) Ball fields.
- (iii) Cemeteries.
- (iv) Plant nurseries.
- (v) Turf farms.
- (vi) Golf courses.
- (tt) "Range land" means open land that has indigenous vegetation.

(uu) "Reclamation site" means drastically disturbed land that is reclaimed using biosolids. The term includes, but is not limited to, strip mines and construction sites.

(vv) "Residuals management program" means a program which is required by a generator's permit and which is developed in accordance with R 323.2403(3)(a) to (d).

(ww) "Retail" means EQ biosolids or an EQ derivative sold directly to the consumer or through retail establishments in bags or other containers that have a load capacity of 1 metric ton (2200 pounds) or less of biosolids.

(xx) "Sanitary sewage" means waste and wastewater from humans, households, or industrial or commercial operations that is discharged to, or otherwise enters, a treatment works.

(yy) "Saturated" or "saturated zone" means the soil pores, that is, spaces between the soil particles or rock are completely filled with water.

(zz) "Septage" means either liquid or solid material that is removed from any of the following that receive only domestic sewage.

(i) A septic tank.

(ii) A cesspool.

(iii) A portable toilet.

(iv) A type III marine sanitation device.

(v) A similar treatment works.

(aaa) "Site" means a contiguous tract of land to which biosolids or a derivative is land-applied in accordance with the requirements in these rules.

(bbb) "Specific oxygen uptake rate" or "SOUR" means the mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in biosolids.

(ccc) "Surface application" means the spraying or spreading of biosolids or derivatives onto the land surface for use as a soil conditioner or as a nutrient source for plant growth.

(ddd) "Surface disposal" means the placement of biosolids on an area of land for final disposal as defined in 40 C.F.R. part 503, subpart C.

(eee) "Surface water" means any of the following:

(i) Lakes.

(ii) Rivers.

(iii) Streams.

(iv) Wetlands.

(v) All other watercourses.

(vi) Waters within the jurisdiction of this state.

(vii) The Great Lakes bordering this state.

(fff) "Treatment of" or "to treat," with respect to biosolids, means the preparation of biosolids for final use or disposal. The term includes, but is not limited to, the thickening, stabilization, and dewatering of biosolids. The term does not include the storage of biosolids.

(ggg) "Treatment works" means either a federally owned, publicly owned, or privately owned device or system used to treat, including recycling and reclaiming, either domestic sewage or sanitary sewage.

(hhh) "Total solids" means the materials in biosolids that remain as residue when biosolids are dried at 103 to 105 degrees Celsius.

(iii) "Unstabilized solids" means organic materials in biosolids that have not been treated in either an aerobic or anaerobic treatment process.

(jjj) "Vector attraction" means the characteristic of biosolids that attracts rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents.

(kkk) "Volatile solids" means the amount of the total solids in biosolids lost when biosolids are combusted at 550 degrees Celsius in the presence of excess air.

(III) "Wetlands" means areas that are inundated or saturated by surface water or groundwater at a frequency and duration 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.

History: 1999 AACCS.

**R 323.2403 Land application permit.**

Rule 2403. (1) A generator or distributor shall have a valid permit before commencing any biosolids land application or distribution activity in the state of Michigan.

(2) A generator or distributor shall submit a permit application on a form provided by the department not less than 180 days before expiration of an existing permit, commencement of biosolids land application, or distribution of a biosolids derivative, except at retail.

(3) All of the following provisions apply to a residuals management program:

(a) A generator shall submit a residuals management program for approval by the department as required by its permit.

(b) A residuals management program submitted to the department shall include all of the following information:

(i) Size and type of generating facility.

(ii) One year of records representing the volume and concentrations of pollutants in the biosolids.

(iii) Treatment process origin, for example, primary or secondary treatment and the volume of biosolids generated from each process.

(iv) A description of the treatment processes.

(v) Storage volume.

(vi) Transportation methods and spill prevention plan.

(vii) Land application method.

(viii) Land application site list.

(ix) Land application plan.

(x) Pathogen reduction method.

(xi) Vector attraction reduction method.

(xii) Monitoring program.

(c) Upon approval by the department, the generating facility shall implement the approved residuals management program.

(d) A generating facility may modify the approved residuals management program by submitting a proposed modification to the department for approval. The modification shall become effective upon approval by the department.

(4) A person shall land apply biosolids or prepare biosolids for land application in accordance with the requirements established in these rules.

History: 1999 AACCS.

**R 323.2404 Imposition of more stringent requirements; proof of payment of costs and fees required; local ordinances.**

Rule 2404. (1) On a case-by-case basis, the permitting authority may impose requirements for the use of biosolids in addition to, or more stringent than, the requirements in these rules if necessary to protect the public health and the environment from any adverse effect of a pollutant in the biosolids.

(2) A person who land applies biosolids in the state from an out-of-state source shall demonstrate proof of payment of the annual biosolids fee and proof of payment of costs for unreasonable adverse effects on the environment or public health caused by the land application of biosolids from an out-of-state source.

(3) A local unit may enact, maintain, and enforce an ordinance that prohibits the land application of biosolids or a derivative if monitoring indicates a pollutant concentration in excess of that provided in table 1 of R 323.2409(5)(a) until subsequent monitoring indicates that pollutant concentrations do not exceed the concentration provided in table 1 of R 323.2409(5)(a).

(4) A local unit may enact an ordinance prescribing standards in addition to, or more stringent than, the standards contained in section 3132 of the act or in these rules under either or both of the following circumstances:

(a) The operation of a biosolids or derivative land application site within the local unit will result in unreasonable adverse effects on the environment or public health within the local unit. The determination that unreasonable adverse effects on the environment or public health will exist shall take into consideration specific populations whose health may be adversely affected within the local unit.

(b) The operation of a biosolids or derivative land application site within the local unit has resulted or will result in the local unit being in violation of other existing state laws or federal laws.

(5) Except as otherwise provided in section 3133 of the act, sections 3131 and 3132 of the act preempt a local ordinance, regulation, or resolution of a local unit that would duplicate, extend, revise, or conflict with section 3131 or 3132 of the act. Except as otherwise provided for in section 3133 of the act, a local unit shall not enact, maintain, or enforce an ordinance, regulation, or resolution that duplicates, extends, revises, or conflicts with section 3131 or 3132 of the act.

(6) The department may contract with a local unit to act as its agent for the purpose of enforcing sections 3131, 3132, and 3133 of the act. The department has the sole authority to assess fees. If a local unit is under contract with the department of environmental quality to act as its agent or if the local unit has received prior written authorization from the department, then the local unit may pass an ordinance that is identical to section 3132 of the act and these rules, except as prohibited in subrule (7) of this rule.

(7) An ordinance enacted under subrule (4) or (6) of this rule shall not conflict with existing state laws or federal laws. An ordinance enacted pursuant to subrule (4)(a) or (b) of this rule shall not be enforced by a local unit until approved or conditionally approved by the director of the department under subrule (8) of this rule. The local unit shall comply with any conditions of approval.

(8) If the legislative body of a local unit submits to the department a resolution identifying how the requirements of subrule (4)(a) or (b) of this rule are met, then the

department shall hold a public meeting in the local unit within 60 days after the submission of the resolution to assist the department in determining whether the requirements of subrule (4)(a) or (b) of this rule are met. Within 45 days after the public meeting, the department shall issue a detailed opinion on whether the requirements of subrule (4)(a) or (b) of this rule are met as identified by the resolution of the local unit and shall approve, conditionally approve, or disapprove the ordinance accordingly. If the department fails to satisfy the requirements of this subrule, then the ordinance is considered to be approved.

History: 1999 AACCS.

### **R 323.2405 Scope.**

Rule 2405. (1) This rule does not establish requirements for any of the following:

(a) The use or disposal of septage.

(b) The surface disposal of biosolids.

(c) The incineration of biosolids fired or co-fired in an incinerator, the incinerator in which biosolids are fired or co-fired, or the use or disposal of ash generated during the firing or co-firing of biosolids.

(d) Processes used to treat biosolids or processes used to treat biosolids before final use or disposal, except as provided in R 323.2414 and R 323.2415.

(e) The use or disposal of sludge generated at an industrial facility during the treatment of industrial wastewater, including sewage sludge generated during the treatment of industrial wastewater combined with domestic sewage.

(f) The use or disposal of sewage sludge determined to be hazardous in accordance with part 111 of the act.

(g) The use or disposal of sewage sludge that has a concentration of polychlorinated biphenyls (PCBs) equal to or greater than 50 milligrams per kilogram of total solids (dry weight basis).

(h) The use or disposal of grit, for example, sand, gravel, cinders, or other materials that have a high specific gravity or the use or disposal of screenings, for example, relatively large materials such as rags, generated during preliminary treatment of domestic sewage or sanitary sewage in a treatment works.

(i) The use or disposal of sludge generated during the treatment of either surface water or groundwater used for drinking water.

(2) This part does not require the selection of a biosolids use or disposal practice. The determination of the manner in which biosolids is used or disposed of is a local determination.

History: 1999 AACCS.

### **R 323.2406 Sampling and analysis; adoption of standards by reference.**

Rule 2406. (1) A person shall collect and analyze representative samples of both biosolids that are applied to the land and soils that receive biosolids.

(2) All of the following publications are adopted by reference in these rules. The publications may be inspected at, and are available from, the Department of



Environmental Quality, Surface Water Quality Division, Knapps Centre-Second Floor, 300 South Washington Square, P.O. Box 30273, Lansing, Michigan 48909-7773, or may be obtained from the standard producer or publisher at the following costs as of the time of adoption of these rules:

(a) For enteric viruses, ASTM standard D 4994-89 entitled "Standard Practice for Recovery of Viruses From Wastewater Sludges," 1992 annual book of ASTM standards, section 11, entitled "Water and Environmental Technology," American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187. Price: \$18.00.

(b) For fecal coliform, part 9221 E or part 9222 D of the publication entitled "Standard Methods for the Examination of Water and Wastewater," 18th edition, 1992, American Public Health Association, 1015 15th Street, NW, Washington, DC 20005. Price: \$200.00.

(c) For Helminth ova, the publication entitled "Environmental Regulations and Technology - Control of Pathogens and Vector Attraction in Sewage Sludge, (Appendix I, Yanko, W.A., 1987)," 1992, EPA-625/R-92/013, United States Environmental Protection Agency, National Center for Environmental

Publications and Information, 11029 Kenwood Road, Cincinnati, Ohio 45242. Price:\$34.50. There is no charge for copies obtained from the Department of Environmental Quality, Surface Water Quality Division, Knapps Centre-Second Floor, 300 South Washington Square, P.O. Box 30273, Lansing, Michigan 48909-7773.

(d) For inorganic pollutants, the publication entitled "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA publication SW-846, second edition (1982) with updates I and II and third edition (1986) with revision I. The second edition, publication number 87-120-291, is available from National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. Price: \$239.00. The third edition, publication number 955-001-00000-1, is available from the Superintendent of Documents, United States Government Printing Office, Washington DC 20402, price: \$319.00, or over the internet at <http://www.epa.gov/epaoswer/hazwaste/test/main.htm>.

(e) For salmonella sp. bacteria, part 9260 D of the publication entitled "Standard Methods for the Examination of Water and Wastewater," 18th edition, 1992, American Public Health Association, 1015 15th Street, NW, Washington, DC 20005, price: \$200.00, or the publication entitled "Environmental Regulations and Technology - Control of Pathogens and Vector Attraction in Sewage Sludge, (Appendix G, Kenner, B.A. and Clark, J.,1974)," 1992, EPA-625/R-92/013, United States Environmental Protection Agency, National Center for Environmental Publications and Information, 11029 Kenwood Road, Cincinnati, Ohio 45242. Price: \$34.50. There is no charge for copies obtained from the Department of Environmental Quality, Surface Water Quality Division, Knapps Centre-Second Floor, 300 South Washington Square, P.O. Box 30273, Lansing, Michigan 48909-7773.

(f) For the specific oxygen uptake rate, part 2710 B of the publication entitled "Standard Methods for the Examination of Water and Wastewater," 18th edition, 1992, American Public Health Association, 1015 15th Street, NW, Washington, DC 20005. Price: \$200.00.

(g) For total, fixed, and volatile solids, part 2540 G of the publication entitled "Standard Methods for the Examination of Water and Wastewater," 18th edition, 1992, American Public Health Association, 1015 15th Street, NW, Washington, DC 20005. Price: \$200.00.

(h) For percent volatile solids reduction calculation, the publication entitled "Environmental Regulations and Technology - Control of Pathogens and Vector Attraction in Sewage Sludge," 1992 EPA-625/R-92/013, United States Environmental Protection Agency, National Center for Environmental Publications and Information, 11029 Kenwood Road, Cincinnati, Ohio 45242. Price:\$34.50.

(i) Nutrient analysis of biosolids for the following parameters shall comply with the POTW sludge sampling and analysis guidance document, EPA 833-B-89-100, August 1989, unless alternative methods are approved by the department based upon an equivalency demonstration:

- (i) Total nitrogen (TN) or total Kjeldahl nitrogen (TKN).
- (ii) Ammonium nitrogen (NH<sub>4</sub>-N).
- (iii) Nitrate nitrogen (NO<sub>3</sub>-N).
- (iv) Total phosphorus (P).
- (v) Total potassium (K).
- (vi) Total solids (%).

The document may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161, at a cost as of the time of adoption of these rules of \$34.00. There is no charge for copies obtained from the Department of Environmental Quality, Surface Water Quality Division, Knapps Centre-Second Floor, 300 South Washington Square, P.O. Box 30273, Lansing, Michigan 48909-7773. All nutrients shall be reported in milligrams per kilogram dry weight.

(3) A person shall use the calculation procedures in the publications listed in subrule (2) of this rule to calculate the percent volatile solids reduction for biosolids. A person shall use the methods in the publications listed in subrule (2) of this rule or the United States environmental protection agency technical support document to analyze samples of biosolids.

(4) Soil fertility test procedures used to analyze soils for pH, lime requirement, and extractable phosphorus (P), potassium (K), calcium (Ca), and magnesium (Mg) shall comply with the procedures described in the publication entitled "Recommended Chemical Soil Test Procedures for the North Central Region." The procedures are adopted by reference in these rules and may be purchased by ordering publication number 221, January 1998, from the Agricultural Experiment Station SB 1001, University of Missouri, Columbia, MO 65211. Price: No cost. Copies may also be obtained at no cost from the Department of Environmental Quality, Surface Water Quality Division, Knapps Centre-Second Floor, 300 South Washington Square, P.O. Box 30273, Lansing, Michigan 48909-7773.

(5) For soils, a Bray P1 (Bray and Kurtz P1) test or Mehlich 3 test for phosphorus (P) shall comply with the procedures described in the publication entitled "Recommended Chemical Soil Test Procedures for the North Central Region," as referenced in subrule (4) of this rule.

(6) Alternate methods for the procedures specified in subrules (4) and (5) of this rule may be used if approved by the department based upon an equivalency demonstration.

History: 1999 AACS.

**R 323.2407 Applicability of R 323.2408(1) and (4) and R 323.2410(3), (4), and (6).**

Rule 2407. (1) The requirements specified in R 323.2408(1) and (4) and the management practices required in R 323.2410(3), (4), and (6) do not apply when bulk biosolids or a bulk derivative is applied to the land if the bulk biosolids or bulk derivative meets the criteria for exceptional quality.

(2) The requirements specified in R 323.2408 and the management practices in R 323.2410 do not apply when non-bulk biosolids or a non-bulk derivative is sold or given away in a bag or other container for application to the land if biosolids or a derivative meets the criteria for exceptional quality.

(3) The department may apply any or all of the requirements specified in R 323.2408 and the management practices in R 323.2410 to biosolids or a derivative as specified in R 323.2407(1) and (2) on a case-by-case basis after determining that the general requirements or management practices are needed to protect the public health and the environment from any reasonably anticipated adverse effect that may occur from any pollutant in the biosolids.

History: 1999 AACS.

**R 323.2408 Application of certain biosolids to certain areas prohibited; application of biosolids from more than 1 source or septage prohibited; applicators duty to obtain information; generator notification duty.**

Rule 2408. (1) A person shall not apply bulk biosolids subject to the cumulative pollutant loading rates specified in R 323.2409(5)(b) to agricultural land, a forest, a public contact site, or a reclamation site if any of the cumulative pollutant loading rates specified in R 323.2409(5)(b) have been reached.

(2) A person shall not knowingly apply biosolids from more than 1 source or septage to the same land application site within the same crop year.

(3) A person who applies biosolids to the land shall obtain information needed to comply with all of the following requirements:

(a) Before a person applies bulk biosolids subject to the cumulative pollutant loading rates in R 323.2409(5)(b) to the land, the person shall contact the state to determine whether bulk biosolids subject to the cumulative pollutant loading rates in R 323.2409(5)(b) have been applied to the site since July 20, 1993, except when the land has been owned by the generator since July 20, 1993, and the cumulative loading rate is known. The notification requirements in subrule (4) of this rule still apply.

(b) If bulk biosolids subject to the cumulative pollutant loading rates in R 323.2409(5)(b) have not been applied to the site since July 20, 1993, then a person may

apply the cumulative amount for each pollutant listed in table 2 in R 323.2409(5)(b) to the site in accordance with R 323.2409(2)(a).

(c) If bulk biosolids subject to the cumulative pollutant loading rates in R 323.2409(5)(b) have been applied to the site since July 20, 1993, and if the cumulative amount of each pollutant applied to the site in the bulk biosolids since that date is known, then a person shall use the cumulative amount of each pollutant applied to the site to determine the additional amount of each pollutant that can be applied to the site in accordance with R 323.2409(2)(a).

(d) If bulk biosolids subject to the cumulative pollutant loading rates in R 323.2409(5)(b) have been applied to the site since July 20, 1993, and if the cumulative amount of each pollutant applied to the site in the bulk biosolids since that date is not known, then a person shall not apply an additional amount of each pollutant to the site in accordance with R 323.2409(2)(a).

(4) All of the following provisions apply to notification of land application activity:

(a) A generator or distributor shall provide written notification not less than 10 days before the initial land application activity at a site. A generator or distributor shall provide the notification to the surface water quality division district office, the county health department, and the city, village, or township clerk in the jurisdiction where land application sites are identified. The notification shall include a cover letter that sets forth all of the following information:

- (i) The proposed land application activity.
- (ii) The site location by latitude and longitude.
- (iii) A plat map identifying the site.
- (iv) The name and address of the property owner.
- (v) The name and address of the farm operator if different than the owner.
- (vi) A record of biosolids monitoring information on a standard form or an acceptable summary containing all of the following:

(A) The most current monitoring results for all of the following:

- (1) Arsenic.
- (2) Cadmium.
- (3) Copper.
- (4) Lead.
- (5) Mercury.
- (6) Molybdenum.
- (7) Nickel.
- (8) Selenium.
- (9) Zinc.

(B) Applicable limitations.

(C) The name, address, and phone number of the generator or distributor.

(b) A generator or distributor shall promptly provide a copy of any record required to be created under these rules to the appropriate county health department and the city, village, or township clerk when biosolids subject to sections 3101, 3131, 3132, and 3133 of the act are applied to land in that local unit. The copy shall be delivered free of charge.

(c) A person who prepares bulk biosolids that are applied to agricultural land, a forest, a public contact site, or a reclamation site shall provide the person who applies the bulk biosolids with written notification of the concentration of the total nutrients, on a dry weight basis, in the bulk biosolids required to be monitored in R 323.2412(1).

(d) If a person who prepares bulk biosolids provides the bulk biosolids to a person who applies the bulk biosolids to the land, then the person who prepares the bulk biosolids shall provide the person who applies the biosolids notice and necessary information to comply with the requirements this part.

(e) If a person who prepares biosolids provides the biosolids to another person who prepares the biosolids, then the person who provides the biosolids shall provide the person who receives the biosolids notice and necessary information to comply with the requirements in this part.

(f) A person who applies bulk biosolids to the land shall provide the owner or leaseholder of the land on which the bulk biosolids are applied notice and necessary information to comply with the requirements in this part.

(g) A person who land applies bulk biosolids subject to the cumulative pollutant loading rates in R 323.2409(5)(b) shall provide written notice, before the initial application of bulk biosolids to a land application site by the applicator, to the permitting authority for the state in which the bulk biosolids will be applied. The permitting authority shall retain, and provide access to, the notice. The notice shall include the following information:

(i) The location, by latitude and longitude, of the land application site.

(ii) The name, address, telephone number, and national pollutant discharge elimination system (NPDES) permit number, if appropriate, of the person who will apply the bulk biosolids.

History: 1999 AACCS.

### **R 323.2409 Application of limitations.**

Rule 2409. (1) A person shall not apply bulk biosolids or biosolids sold or given away in a bag or other container to the land if the concentration of any pollutant in the biosolids exceeds the ceiling concentration for the pollutant in table 1 of this rule.

(2) If bulk biosolids are applied to agricultural land, a forest, a public contact site, or a reclamation site, then the applicator shall comply with either of the following provisions:

(a) The cumulative loading rate for each pollutant shall not exceed the cumulative pollutant-loading rate for the pollutant in table 2 of this rule.

(b) The concentration of each pollutant in the biosolids shall not exceed the concentration for the pollutant in table 3 of this rule.

(3) If bulk biosolids are applied to a lawn or a home garden, then the concentration of each pollutant in the biosolids shall not exceed the concentration for the pollutant in table 3 of this rule.

(4) If biosolids are sold or given away in a bag or other container for application to the land, then the distributor shall comply with either of the following provisions:

(a) The concentration of each pollutant in the biosolids shall not exceed the concentration for the pollutant in table 3 of this rule.

(b) The product of the concentration of each pollutant in the biosolids and the annual whole biosolids application rate for the biosolids shall not cause the annual pollutant-loading rate for the pollutant in table 4 of this rule to be exceeded. The procedure used to determine the annual whole biosolids application rate is specified in R 323.2417.

(5) The following tables specify pollutant concentrations, loading rates, and nutrient parameters:

(a) TABLE 1 -- Ceiling Pollutant Concentrations

Pollutant	Ceiling Concentration milligrams per kilogram (on a dry weight basis)
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7500

(b) TABLE 2 -- Cumulative Pollutant Loading Rates

Pollutant	Cumulative Pollutant Loading Rate	
	Kilograms per hectare (kg/ha)	Pounds per acre (lbs/ac)
Arsenic	41	37
Cadmium	39	35
Copper	1500	1335
Lead	300	267
Mercury	17	15
Nickel	420	374
Selenium	100	89
Zinc	2800	2492

(c) TABLE 3 -- Pollutant Concentrations

Pollutant	Concentration milligrams per kilogram (on a dry weight basis)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	100
Zinc	2800

(d) TABLE 4 -- Annual Pollutant Loading Rates

Pollutant	Annual Pollutant Loading Rates <sup>1</sup>	
	kilograms per hectare (kg/ha)	pounds per acre (lbs/ac)
Arsenic	2.0	1.8
Cadmium	1.9	1.7
Copper	75	67
Lead	15	13
Mercury	0.85	0.76
Nickel	21	19
Selenium	5.0	4.5
Zinc	140	125

<sup>1</sup>per 365-day period.

History: 1999 AACS.

**R 323.2410 Management practices.**

Rule 2410. (1) A person shall not apply bulk biosolids to the land if it is likely to adversely affect a threatened or endangered species listed under section 36503 of the act or its designated critical habitat.

(2) A person shall not apply bulk biosolids to agricultural land, a forest, a public contact site, or a reclamation site that is flooded, saturated with water, frozen, or snow-covered so that the bulk biosolids enter a wetland or other waters of the state.

(3) A person may subsurface inject bulk biosolids on frozen or snow-covered ground as long as there is substantial soil coverage of the applied biosolids. A person shall

not surface apply bulk biosolids, other than exceptional quality biosolids, on frozen or snow-covered ground, unless otherwise approved by the department.

(4) A person shall not apply bulk biosolids on lands having a slope of more than 6% for surface application or more than 12% for subsurface injected biosolids, unless the person uses the bulk biosolids in accordance with a department-approved site management plan.

(5) A person shall apply bulk biosolids to agricultural land, a forest, a public contact site, or a reclamation site at an application rate that is equal to, or less than, the agronomic rate, unless the person that applies bulk biosolids in accordance with a department-approved site management plan.

(6) A generator or distributor shall affix a label to the bag or other container in which biosolids are sold or given away for application to the land or the generator or distributor shall provide an information sheet to the person who receives biosolids sold or given away in another container for application to the land. The label or information sheet shall contain all of the following information:

(a) The name and address of the person who prepared the biosolids that are sold or given away in a bag or other container for application to the land.

(b) A statement that the application of the biosolids to the land is prohibited unless applied according to the instructions on the label or information sheet.

(c) The annual whole biosolids application rate for biosolids that do not cause any of the annual pollutant loading rates in table 4 of R 323.2409(5)(d) to be exceeded.

(7) A person that applies biosolids shall perform soil fertility tests on soils sampled from each application site before initial biosolids application. The person shall resample and test on a regular basis so that the last soil fertility test is not more than 2 years old at the time of the next biosolids application.

(8) For agricultural land, a person shall apply biosolids in accordance with agronomic rates. If the Bray P1 soil test level exceeds 300 pounds (P) per acre (150 ppm), or if the Mehlich 3 soil test level exceeds 340 pounds (P) per acre (170 ppm) in site soils, then the person shall not apply biosolids until the soil P test level decreases to less than 1 of these values.

(9) For silvicultural land, such as forestland and tree farms, a person shall base the agronomic rate for silvicultural land on the quantity of plant-available nitrogen (PAN) that growing trees will take up annually. A person may reapply biosolids at rates that will provide PAN additions up to a maximum of 5 years, using the annual PAN additions listed in table 5 to calculate total PAN additions for 1 year up to a 5-year maximum for the particular tree species and age of the stand receiving biosolids. A person may reapply biosolids after the time interval selected for the previous application expires, as long as the trees are still growing. If the Bray P1 soil test level exceeds 200 pounds (P) per acre (100 ppm) or the Mehlich 3 soil test level exceeds 220 pounds (P) per acre (110ppm), then a person shall not apply biosolids until the soil P test level decreases to less than 1 of these values.

(10) The rates for wastewater biosolids application in Michigan forests (Brockway, 1988) are as follows:



TABLE 5  
PAN Applied from Biosolids<sup>1</sup>

Forest Type	Age of Tree Stand in Years	Annual Use	Total Used in 5 Years
Aspen	0 to 5	50	250
Aspen	6 to 20	100	500
Aspen	Over 20	50	250
Northern Hardwoods	0 to 10	40	200
Northern Hardwoods	11 to 30	80	400
Northern Hardwoods	Over 20	40	200
Oak-Hickory	0 to 10	50	250
Oak-Hickory	11 to 30	100	500
Oak-Hickory	Over 30	50	250
Elm-Ash-Cottonwood	0 to 5	50	250
Elm-Ash-Cottonwood	6 to 20	100	500
Elm-Ash- Cottonwood	Over 20	50	250
Scrub oak	0 to 20	20	100
Scrub oak	Over 20	40	200
Red, White, Jack Pine	0 to 10	50	250
Red, White, Jack Pine	11 to 30	40	200
Red, White, Jack Pine	Over 30	20	100
Spruce Fir	0 to 10	40	200
Spruce Fir	11 to 30	30	150
Spruce Fir	Over 30	20	100
Northern White-cedar	0 to 20	40	200
Northern White-cedar	Over 20	20	100

<sup>1</sup> PAN = Plant-available nitrogen, or the amount of nitrogen that will be available for trees to utilize (pounds per acre per year).

(11) The following isolation distances shall be observed when land applying bulk biosolids:

TABLE 6  
Isolation Distance Requirements

Isolation from existing:	Distance (feet)	
	Injection or Surface application with incorporation*	Surface application without incorporation
Municipal well (type I or type IIA) **	2000	2000
Noncommunity public Water supply (type IIB or type III)	800	800
Domestic well	100	150
Homes	100	150
Commercial Buildings	100	150
Surface waters***	50	150

\* Incorporation must be within 48 hours, unless a shorter time period is specified in these rules.

\*\* As defined and specified in Act No. 399 of the Public Acts of 1976, as amended, being §325.1001 et seq. of the Michigan Compiled Laws, and known as the safe drinking water act. As specified in Act No. 399 of the Public Acts of 1976, as amended, the term includes water supplies such as schools, restaurants, industries, campgrounds, parks, and hotels.

\*\*\* Surface waters do not include grassed drainage ways or drainage ways that are tilled and planted.

(12) A person shall apply biosolids in a manner that would maintain, at a minimum, a 30-inch separation distance between the soil surface and the groundwater at the time of biosolids application.

History: 1999 AACS.

**R 323.2411 Operational standards; pathogens and vector attraction reduction.**

Rule 2411. (1) All of the following provisions apply to pathogens:

(a) A person shall meet the class A pathogen requirements in R 323.2414(2)(a) or the class B pathogen requirements and site restrictions in R 323.2414(3)(a) when bulk biosolids are applied to agricultural land, a forest, a public contact site, or a reclamation site.

(b) A person shall meet the class A pathogen requirements in R 323.2414(2)(a) when bulk biosolids are applied to a lawn or a home garden. A person shall meet the class A pathogen requirements in R 323.2414(2)(a) when biosolids are sold or given away in a bag or other container for application to the land.

(2) All of the following provisions apply to vector attraction:

A person shall meet 1 of the vector attraction reduction requirements in R 323.2415(4)(a) through (h) or the vector attraction reduction requirements in R 323.2415(4)(i) or (j) when bulk biosolids are applied to agricultural land, a forest, a public contact site, or a reclamation site. A person shall meet 1 of the vector attraction reduction requirements in R 323.2415(4)(a) through (h) when bulk biosolids are applied to a lawn or a home garden. A person shall meet 1 of the vector attraction reduction requirements in R 323.2415(4)(a) through (h) when biosolids are sold or given away in a bag or other container for application to the land.

History: 1999 AACCS.

**R 323.2412 Frequency of monitoring.**

Rule 2412. (1) A person shall comply with the frequency of monitoring for all of the following as specified in table 7:

- (a) Total nitrogen (TN) or total Kjeldahl nitrogen (TKN).
- (b) Ammonium nitrogen (NH<sub>4</sub>-N).
- (c) Nitrate nitrogen (NO<sub>3</sub>-N).
- (d) Total phosphorus (P).
- (e) Total potassium (K).
- (f) Total solids.
- (g) Arsenic.
- (h) Cadmium.
- (i) Copper.
- (j) Lead.
- (k) Mercury.
- (l) Molybdenum.
- (m) Nickel.
- (n) Selenium.
- (o) Zinc.

The pathogen density requirements in R 323.2414(2)(a) and in R 323.2414(3)(c).

(q) The vector attraction reduction requirements in R 323.2415(4)(a) through (d) and R 323.2415(4)(f) through (h).

(2) Table 7 reads as follows:

TABLE 7 -- Frequency of Monitoring - Land Application  
Amount of Biosolids Produced (per 365-day period)

English Dry Tons	Metric Dry Tons	Frequency
Greater than zero, But less than 320	Greater than zero, but less than 290	Once per year
Equal to or greater than 320, but Less than 1,650	Equal to or greater than 290, but less than 1,500	Once per quarter (4 times per year)
Equal to or greater than 1,650, but Less than 16,500	Equal to or greater than 1,500, but less than 15,000	Once per 60 days (6 times per year)
Equal to or greater than 16,500	Equal to or greater than 15,000	Once per month (12 times per year)

(3) After the biosolids have been monitored for 2 years at the frequency in table 7 of this rule, the permitting authority may reduce the frequency of monitoring for pollutant concentrations and for the pathogen density requirements in R 323.2414(2)(e)(ii) and (iii), but the frequency of monitoring shall be not less than once per year when biosolids are applied to the land.

(4) If biosolids are accumulated before removal, the monitoring frequency, at a minimum, is that specified in this rule. If monitoring of biosolids or a derivative indicates a pollutant concentration in excess of that provided in table 3 of R 323.2409(5)(c), then the monitoring frequency shall be increased to not less than twice that provided for in table 7 until pollutant concentrations are at or below the concentrations provided in table 3 of R 323.2409(5)(c). In the case of biosolids accumulating for periods of more than 1 year, biosolids must be monitored at the frequency determined in table 7 only in the year the biosolids are used. For a generator who removes biosolids monthly or more frequently, monitoring is required at least once per month each month that the biosolids are removed, unless more frequent monitoring is required in subrule(1) of this rule.

History: 1999 AACS.

**R 323.2413 Recordkeeping.**

Rule 2413. (1) A generator shall keep records for a minimum of 5 years unless a longer period is specified by the permitting authority.

(2) A person who generates bulk biosolids or bulk derivatives, including a generator from out of state, shall keep all of the following records and make the records available for inspection and copying:

(a) Site information of each application site, which includes all of the following information:

(i) A plat map.

(ii) A soil survey map, if available.

(iii) The name and address of the property owner and farm operator if different than the owner.

(iv) The latitude and longitude.

(b) Written consent to apply biosolids from the property owner and farm operator if different than the property owner.

(c) A written agreement between the generator and the farmer not to apply biosolids from other sources or septage to a listed land application site. Biosolids from other sources may be land-applied to a site only after that site is relinquished in writing to another generating facility.

(d) Biosolids analysis parameters listed in table 1 of R 323.2409(5)(a) at the frequency of analysis stated in table 7 of R 323.2412.

(e) Soil fertility test results for each site.

(f) For each biosolids-applied site, a summary of the application activity shall include all of the following information:

(i) Site identification.

(ii) Biosolids analysis.

(iii) Total acres in the site.

(iv) Acres used.

(v) Application rate in dry tons per acre.

(vi) Each nutrient required to be monitored in R 323.2412 in pounds per acre.

(vii) Each pollutant listed in table 3 of R 323.2409(5)(c), in pounds per acre, if the site has received biosolids that exceed the concentrations specified in table 3 of R 323.2409(5)(c).

(g) The information in R 323.2408(4)(g) before applying biosolids to the land that exceed the concentrations specified in table 3 of R 323.2409(5)(c). If biosolids that exceed table 3 pollutant concentrations for any pollutant have been applied, then the generator shall keep records documenting the cumulative loading for the life of the site.

An annual summary, including all of the following information:

(i) Biosolids volume generated.

(ii) Total dry tons applied to the land or distributed.

(iii) Total dry tons disposed of by other methods.

(iv) Total acres used.

Sites that received biosolids application subject to table 2 of R 323.2409(5)(b).

(i) A person who generates biosolids shall provide all application rate information from the monitoring of pollutant concentrations specified in R 323.2409(5)(c) and nutrients specified in R 323.2412 and agronomic information specified in R 323.2410(7) to the property owner or farm operator, or both, upon completion of any biosolids activity on a site.

(j) All certification statements relating to management practices, pathogen reduction, and vector attraction.

(k) The information specified in subrule 7(b) of this rule, on October 30 of each year when 90% or more of any of the cumulative pollutant loading rates in table 2 of R 323.2409(5)(b) is reached at a site.

(3) A person who prepares biosolids subject to these rules shall develop the following information and shall retain the information for 5 years, unless a longer period is specified:

(a) The annual average, annual minimum, and annual maximum concentration of each pollutant in the biosolids listed in table 3 of R 323.2409(5)(c).

(b) The following certification statement:

"I certify, under penalty of law, that information that will be used to determine compliance with the class A pathogen requirements in R 323.2414(2) and the vector attraction reduction requirement in [insert 1 of the vector attraction reduction requirements in R 323.2415(4)(a) to (h)] has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(c) A description of how the class A pathogen requirements in R 323.2414(2) are met.

(d) A description of how 1 of the vector attraction reduction requirements in R 323.2415(4)(a) to (h) is met.

(4) A person who derives a material subject to these rules shall develop the following information and shall retain the information for 5 years:

(a) The annual average, annual minimum, and annual maximum concentration of each pollutant in the material listed in table 3 of R 323.2409(5)(c).

(b) The following certification statement:

"I certify, under penalty of law, that information that will be used to determine compliance with the class A pathogen requirements in R 323.2414(2) and the vector attraction reduction requirement in [insert 1 of the vector attraction reduction requirements in R 323.2415(4)(a) to (h)] has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(c) A description of how the class A pathogen requirements in R 323.2414(2) are met.

(d) A description of how 1 of the vector attraction reduction requirements in R 323.2415(4)(a) to (h) is met.

(5) If the pollutant concentrations in R 323.2409(5)(c), the class A pathogen requirements in R 323.2414(2), and the vector attraction reduction requirements in R 323.2415(4)(i) or (j) are met when bulk biosolids are applied to agricultural land, a forest, a public contact site, or a reclamation site, then both of the following provisions shall be complied with:

(a) The person who prepares the bulk biosolids shall develop all of the following information and shall retain the information for 5 years:

(i) A concentration of each pollutant in the bulk biosolids listed in R 323.2409(5)(c), table 3.

(ii) The following certification statement:

"I certify, under penalty of law, that information that will be used to determine compliance with the pathogen requirements in R 323.2414(2) has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(iii) A description of how the pathogen requirements in R 323.2414(2) are met.

(b) The person who applies the bulk biosolids shall develop all of the following information and shall retain the information for 5 years:

(i) The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the management practices in R 323.2410 and the vector attraction reduction requirement in [insert R 323.2415(4)(i) or (j)] has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(ii) A description of how the management practices in R 323.2410 are met for each site on which bulk biosolids are applied.

(iii) A description of how the vector attraction reduction requirements in either R 323.2415(4)(i) or (j) are met for each site on which bulk biosolids are applied.

(6) If the pollutant concentrations in R 323.2409(5)(c) and the class B pathogen requirements in R 323.2414(3) are met when bulk biosolids are applied to agricultural land, a forest, a public contact site, or a reclamation site, then both of the following provisions shall be complied with:

(a) The person who prepares the bulk biosolids shall develop the following information and shall retain the information for 5 years:

(i) The annual average, annual minimum, and annual maximum concentration of each pollutant in the bulk biosolids listed in table 3 of R 323.2409(5)(c).

(ii) The following certification statement:

"I certify under, penalty of law, that the information that will be used to determine compliance with the class B pathogen requirements in R 323.2414(3) and the vector attraction reduction requirement in [insert 1 of the vector attraction reduction requirements in R 323.2415(4)(a) to (h) if one of those requirements is met] has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(iii) A description of how the class B pathogen requirements in R 323.2414(3)(f) are met.

(iv) When 1 of the vector attraction reduction requirements in R 323.2415(4)(a) to (h) is met, a description of how the vector attraction reduction requirement is met.

(b) The person who applies the bulk biosolids shall develop all of the following information and shall retain the information for 5 years:

(i) The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the management practices in R 323.2410, the site restrictions in R 323.2414(3)(f), and the vector attraction reduction requirements in [insert either R 323.2415(4)(i) or (j), if one of the requirements is met] has been prepared for each site on which bulk biosolids are applied under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather

and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(ii) A description of how the management practices in R 323.2410 are met for each site on which bulk biosolids are applied.

(iii) A description of how the site restrictions in R 323.2414(3)(f) are met for each site on which bulk biosolids are applied.

(iv) When the vector attraction reduction requirement in R 323.2415(4)(i) or (j) is met, a description of how the vector attraction reduction requirement is met.

(v) The date bulk biosolids are applied to each site.

(7) If the requirements in R 323.2409(2)(a) are met when bulk biosolids are applied to agricultural land, a forest, a public contact site, or a reclamation site, then both of the following provisions shall be complied with:

(a) The person who prepares the bulk biosolids shall develop all of the following information and shall retain the information for 5 years:

(i) The annual average, annual minimum, and annual maximum concentration of each pollutant listed in table 1 of R 323.2409(5)(a) in the bulk biosolids.

(ii) The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the pathogen requirements in [insert either R 323.2414(2) or (3)] and the vector attraction reduction requirement in [insert 1 of the vector attraction reduction requirements in R 323.2415(4)(a) to (h) if one of the requirements is met] has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(iii) A description of how the pathogen requirements in R 323.2414(2) or (3) are met.

(iv) When 1 of the vector attraction requirements in R 323.2415(4)(a) to (h) is met, a description of how the vector attraction requirement is met.

(b) The person who applies the bulk biosolids shall develop all of the following information, retain the information in paragraphs (i) to (vii) of this subdivision indefinitely, and retain the information in paragraphs (viii) to (xiii) of this subdivision for 5 years:

(i) The location, by latitude and longitude, of each site on which bulk biosolids are applied.

(ii) The number of hectares in each site on which bulk biosolids are applied.

(iii) The date bulk biosolids are applied to each site.

(iv) The cumulative amount of each pollutant listed in table 2 of R 323.2409(5)(b) in the bulk biosolids applied to each site, including the amount in R 323.2408(3)(b).

(v) The amount of biosolids applied to each site.

(vi) The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the requirements to obtain information in R 323.2408(3)(a) has been prepared for each site on which bulk biosolids are applied under my direction and supervision in accordance with the system designed to ensure that qualified personnel



properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(vii) A description of how the requirements to obtain information in R 323.2408(3)(a) are met.

(viii) The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the management practices in R 323.2410 have been prepared for each site on which bulk biosolids are applied under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(ix) A description of how the management practices in R 323.2410 are met for each site on which bulk biosolids are applied.

(x) The following certification statement when the bulk biosolids meet the class B pathogen requirements in R 323.2414(3):

"I certify, under penalty of law, that the information that will be used to determine compliance with the site restrictions in R 323.2414(3)(f) has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(xi) A description of how the site restrictions in R 323.2414(3)(f) are met for each site on which class B bulk biosolids are applied.

(xii) The following certification statement when the vector attraction reduction requirement in R 323.2415(4)(i) or (j) is met:

"I certify, under penalty of law, that the information that will be used to determine compliance with the vector attraction reduction requirement in [insert either R 323.2415(4)(i) or (j)] has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(xiii) If the vector attraction reduction requirements in R 323.2415(4)(i) or (j) are met, a description of how the requirements are met.

(8) If the requirements in R 323.2409(4)(b) are met when biosolids are sold or given away in a bag or other container for application to the land, then the person who prepares the biosolids that are sold or given away in a bag or other container shall develop all of the following information and shall retain the information for 5 years:

(a) The annual whole biosolids application rate for the biosolids that do not cause the annual pollutant loading rates in table 4 of R 323.2409(5)(d) to be exceeded.

The concentration of each pollutant in the biosolids listed in table 4 of R 323.2409(5)(d).

(c) The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the management practice in R 323.2410(7), the class A pathogen requirement in R 323.2414(2), and the vector attraction reduction requirement in [insert 1 of the vector attraction reduction requirements in R 323.2415(4)(a) to (h)] has been

prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

(d) A description of how the class A pathogen requirements in R 323.2414(2) are met.

A description of how 1 of the vector attraction requirements in R 323.2415(4)(a) to (h) is met.

History: 1999 AACCS.

### **R 323.2414 Pathogens.**

Rule 2414. (1) This rule contains both of the following:

(a) The requirements for biosolids to be classified either class A or class B with respect to pathogens.

(b) The site restrictions for land on which a class B biosolid is applied.

(2) All of the following requirements apply to class A biosolids:

(a) The requirement in subdivision (b) of this subrule and the requirements in subdivision (c), (d), (e), (f), or (g) of this subrule shall be met for biosolids to be classified class A with respect to pathogens.

(b) The class A pathogen requirements in subdivisions (c) to (g) of this subrule shall be met either before meeting the vector attraction reduction requirements in R 323.2415 or at the same time that the vector attraction reduction requirements in R 323.2415 are met, except when the vector attraction reduction requirements in R 323.2415(4)(f) to (h) are met.

(c) Both of the following provisions apply to class A alternative 1, which is not applicable for composting:

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 most probable number per gram of total solids (dry weight basis) or the density of salmonella sp. bacteria in the biosolids shall be less than 3 most probable number per 4 grams of total solids (dry weight basis) at the time the biosolids are used, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids or material derived from biosolids is prepared to meet the requirements in R 323.2407(1) or (2).

(ii) The temperature of the biosolids that are used shall be maintained at a specific value for a period of time as follows:

(A) If the percent solids of the biosolids is 7% or higher, then the temperature of the biosolids shall be 50 degrees Celsius or higher; the time period shall be 20 minutes or longer; and the temperature and time period shall be determined using equation (3), except when small particles of biosolids are heated by either warmed gases or an immiscible liquid.

$$\text{equation (3)} \quad D = \frac{131,700,000}{10^{0.1400t}}$$

Where, D = time in days.

t = temperature in degrees Celsius.

(B) If the percent solids of the biosolids is 7% or higher and small particles of biosolids are heated by either warmed gases or an immiscible liquid, then the temperature of the biosolids shall be 50 degrees Celsius or higher; the time period shall be 15 seconds or longer; and the temperature and time period shall be determined using equation (3).

(C) If the percent solids of the biosolids is less than 7% and the time period is at least 15 seconds, but less than 30 minutes, then the temperature and time period shall be determined using equation (3).

(D) If the percent solids of the biosolids is less than 7%; the temperature of the biosolids is 50 degrees Celsius or higher; and the time period is 30 minutes or longer, then the temperature and time period shall be determined using equation (4).

$$\text{equation (4)} \quad D = \frac{50,070,000}{10^{0.1400t}}$$

Where, D = time in days.

t = temperature in degrees Celsius.

(d) Both of the following provisions apply to class A alternative 2:

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 most probable number per gram of total solids (dry weight basis) or the density of salmonella sp. bacteria in the biosolids shall be less than 3 most probable number per 4 grams of total solids (dry weight basis) at the time the biosolids is used, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids or material derived from biosolids are prepared to meet the requirements in R 323.2407(1) or (2).

(ii) The pH of the biosolids that are used or disposed of shall be raised to above 12 and shall remain above 12 for 72 hours. The temperature of the biosolids shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the biosolids is above 12. At the end of the 72-hour period that the pH of the biosolids is above 12, the biosolids shall be air-dried to achieve a percent solids in the biosolids of more than 50%.

(e) All of the following provisions apply to class A alternative 3:

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 most probable number per gram of total solids (dry weight basis) or the density of salmonella sp. bacteria in biosolids shall be less than 3 most probable number per 4 grams of total solids (dry weight basis) at the time the biosolids are used or disposed of, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids or material derived from biosolids is prepared to meet the requirements in R 323.2407(1) or (2).

(ii) All of the following provisions apply to biosolids analysis for enteric viruses:

(A) The biosolids shall be analyzed before pathogen treatment to determine whether the biosolids contain enteric viruses.

(B) If the density of enteric viruses in the biosolids before pathogen treatment is less than 1 plaque-forming unit per 4 grams of total solids (dry weight basis), then the

biosolids are class A with respect to enteric viruses until the next monitoring episode for the biosolids.

(C) If the density of enteric viruses in the biosolids before pathogen treatment is equal to or greater than 1 plaque-forming unit per 4 grams of total solids (dry weight basis), then the biosolids are class A with respect to enteric viruses if the density of enteric viruses in the biosolids after pathogen treatment is less than 1 plaque-forming unit per 4 grams of total solids (dry weight basis) and if the values or ranges of values for the operating parameters for the pathogen treatment process that produces the biosolids that meets the enteric virus density requirement are documented.

(D) After the enteric virus reduction in subparagraph (C) of this paragraph is demonstrated for the pathogen treatment process, the biosolids continue to be class A with respect to enteric viruses if the values for the pathogen treatment process operating parameters are consistent with the values or ranges of values documented in subparagraph(C) of this paragraph.

(iii) All of the following provisions apply to biosolids analysis for viable helminth ova:

(A) The biosolids shall be analyzed before pathogen treatment to determine whether the biosolids contain viable helminth ova.

(B) If the density of viable helminth ova in the biosolids before pathogen treatment is less than 1 per 4 grams of total solids (dry weight basis), then the biosolids are class A with respect to viable helminth ova until the next monitoring episode for the biosolids.

(C) If the density of viable helminth ova in the biosolids before pathogen treatment is equal to or greater than 1 per 4 grams of total solids (dry weight basis), then the biosolids are class A with respect to viable helminth ova if the density of viable helminth ova in the biosolids after pathogen treatment is less than 1 per 4 grams of total solids (dry weight basis) and if the values or ranges of values for the operating parameters for the pathogen treatment process that produces the biosolids that meet the viable helminth ova density requirement are documented.

(D) After the viable helminth ova reduction in subparagraph (C) of this paragraph is demonstrated for the pathogen treatment process, the biosolids continue to be class A with respect to viable helminth ova if the values for the pathogen treatment process operating parameters are consistent with the values or ranges of values documented in subparagraph (C) of this paragraph.

(f) All of the following provisions apply to class A alternative 4:

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 most probable number per gram of total solids (dry weight basis) or the density of salmonella sp. bacteria in the biosolids shall be less than 3 most probable number per 4 grams of total solids (dry weight basis) at the time the biosolids are used or disposed of, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids or material derived from biosolids is prepared to meet the requirements in R 323.2407(1) or (2).

(ii) The density of enteric viruses in the biosolids shall be less than 1 plaque-forming unit per 4 grams of total solids (dry weight basis) at the time the biosolids are used or disposed of, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids or material

derived from biosolids is prepared to meet the requirements in R 323.2407(1) or (2), unless otherwise specified by the permitting authority.

(iii) The density of viable helminth ova in the biosolids shall be less than 1 per 4 grams of total solids (dry weight basis) at the time the biosolids are used or disposed of, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids or material derived from biosolids is prepared to meet the requirements in R 323.2407(1) or (2), unless otherwise specified by the permitting authority.

(g) Both of the following provisions apply to class A alternative 5:

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 most probable number per gram of total solids (dry weight basis) or the density of salmonella, sp. bacteria in the biosolids shall be less than 3 most probable number per 4 grams of total solids (dry weight basis) at the time the biosolids are used or disposed of, at the time the biosolids is prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids or material derived from biosolids is prepared to meet the requirements in R 323.2407(1) or (2).

(ii) Biosolids that are used or disposed of shall be treated in 1 of the processes to further reduce pathogens described in R 323.2418(2).

(h) Both of the following provisions apply to class A alternative 6:

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 most probable number per gram of total solids (dry weight basis) or the density of salmonella, sp. bacteria in the biosolids shall be less than 3 most probable number per 4 grams of total solids (dry weight basis) at the time the biosolids are used or disposed of, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids or material derived from biosolids is prepared to meet the requirements in R 323.2407(1) or (2).

(ii) Biosolids that are used or disposed of shall be treated in a process that is equivalent to a process to further reduce pathogens, as determined by the permitting authority.

(3) All of the following provisions apply to class B biosolids:

(a) The requirements in subdivision (c), (d), or (e) of this subrule shall be met for biosolids to be classified class B with respect to pathogens.

(b) The site restrictions in subdivision (f) of this subrule shall be met if biosolids that meet the class B pathogen requirements in subdivision (c), (d), or (e) of this subrule are applied to the land.

(c) Both of the following provision apply to class B alternative 1:

(i) Seven representative samples of the biosolids that are used shall be collected.

(ii) The geometric mean of the density of fecal coliform in the samples collected in subdivision (c)(i) of this subrule shall be less than either 2,000,000 most probable number per gram of total solids (dry weight basis) or 2,000,000 colony-forming units per gram of total solids (dry weight basis).

(d) With respect to class B alternative 2, biosolids that are used or disposed of shall be treated in 1 of the processes to significantly reduce pathogens described in R 323.2418(1).

(e) With respect to class B alternative 3, biosolids that are used or disposed of shall be treated in a process that is equivalent to a process to significantly reduce pathogens, as determined by the permitting authority.

(f) All of the following provisions apply to site restrictions:

(i) A landowner shall not harvest food crops that have harvested parts which touch the biosolids/soil mixture and which are totally above the land surface for 14 months after biosolids are applied.

(ii) A landowner shall not harvest food crops that have harvested parts below the surface of the land for 20 months after biosolids are applied if the biosolids remain on the land surface for 4 months or longer before incorporation into the soil.

(iii) A landowner shall not harvest food crops that have harvested parts below the surface of the land for 38 months after biosolids are applied if the biosolids remain on the land surface for less than 4 months before incorporation into the soil.

(iv) A landowner shall not harvest food crops, feed crops, and fiber crops for 30 days after biosolids are applied.

(v) A landowner shall not graze animals on the land for 30 days after biosolids are applied.

(vi) A land owner shall not harvest turf grown on land where biosolids are applied for 1 year after biosolids are applied if the harvested turf is placed on either land that has a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.

(vii) A landowner shall restrict public access to land that has a high potential for public exposure for 1 year after biosolids are applied.

(viii) A landowner shall restrict public access to land with a low potential for public exposure for 30 days after biosolids are applied.

History: 1999 AACS.

### **R 323.2415 Vector attraction reduction.**

Rule 2415. (1) A person who prepares bulk biosolids for application to agricultural land, a forest, a public contact site, or a reclamation site shall meet 1 of the vector attraction reduction requirements in subrule (4)(a) to (h) of this rule or shall meet the vector attraction reduction requirements of subrule (4)(i) or (j) of this rule.

(2) A person who prepares bulk biosolids for application to a lawn or a home garden shall meet 1 of the vector attraction reduction requirements in subrule (4)(a) to (h) of this rule.

(3) A person who prepares bulk biosolids that is sold or given away in a bag or other container for application to the land shall meet 1 of the vector attraction reduction requirements in subrule (4)(a) to (h) of this rule.

(4) All of the following provisions apply to vector attraction reduction processes:

(a) A generator shall reduce the mass of volatile solids in the biosolids by a minimum of 38%.

(b) If the 38% volatile solids reduction requirement in subdivision (a) of this subrule cannot be met for an anaerobically digested biosolids, then a generator may demonstrate vector attraction reduction by digesting a portion of the previously digested biosolids anaerobically in the laboratory in a bench-scale unit for 40 additional days at

a temperature between 30 and 37 degrees Celsius. When, at the end of the 40 days, the volatile solids in the biosolids at the beginning of the 40-day period are reduced by less than 17%, vector attraction reduction is achieved.

(c) If the 38% volatile solids reduction requirement in subdivision (a) of this subrule cannot be met for aerobically digested biosolids, then a generator may demonstrate vector attraction reduction by digesting a portion of the previously digested biosolids that have a percent solids of 2% or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. When, at the end of the 30 days, the volatile solids in the biosolids at the beginning of the 30-day period is reduced by less than 15%, vector attraction reduction is achieved.

(d) A generator shall ensure that the specific oxygen uptake rate (SOUR) for biosolids treated in an aerobic process is 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 degrees Celsius.

(e) A generator shall treat biosolids in an aerobic process for 14 days or longer. During that time, a generator the temperature of the biosolids shall be higher than 40 degrees Celsius and the average temperature of the biosolids shall be higher than 45 degrees Celsius.

(f) A generator shall ensure that the pH of biosolids is raised to 12 or higher by alkali addition and, without the addition of more alkali, remains at 12 or higher for 2 hours and then at 11.5 or higher for an additional 22 hours.

(g) A generator shall ensure that the percent solids of biosolids that do not contain unstabilized solids generated in a primary wastewater treatment process is equal to or greater than 75% based on the moisture content and total solids before mixing with other materials, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids are prepared to meet the requirements in R 323.2407(1) or (2).

(h) A generator shall ensure that the percent solids of biosolids that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90% based on the moisture content and total solids before mixing with other materials, at the time the biosolids are prepared for sale or given away in a bag or other container for application to the land, or at the time the biosolids are prepared to meet the requirements in R 323.2407(1) or (2).

(i) All of the following provisions apply to biosolids that are injected:

(i) A person who applies biosolids shall inject below the surface of the land.

(ii) A person who applies biosolids shall ensure that a significant amount of the biosolids is not present on the land surface within 1 hour after the biosolids are injected.

(iii) If the biosolids that are injected below the surface of the land are class A with respect to pathogens, then a person who applies the biosolids shall ensure that the biosolids are injected below the land surface within 8 hours after the biosolids have been discharged from the pathogen treatment process.

(j) A person who applies biosolids to the land surface shall ensure that the biosolids are incorporated into the soil within 6 hours after application to or placement on the land, unless otherwise specified by the permitting authority. If biosolids that are incorporated into the soil are class A with respect to pathogens, then the person shall

apply the biosolids to, or place the biosolids on, the land within 8 hours after the biosolids have been discharged from the pathogen treatment process.

History: 1999 AACCS.

**R 323.2416 Reporting; fees; biosolids land application fund; creation.**

Rule 2416. (1) Beginning in state fiscal year 1998, an annual biosolids land application fee is imposed upon biosolids generators and biosolids distributors. The biosolids land application fee is an amount equal to the sum of an administrative fee and a generation fee. The administrative fee is \$400.00 for each biosolids generator or distributor that land applies. The department shall set the generation fee as provided by subrule (2) of this rule. The department shall set the generation fee so that the annual cumulative total of the biosolids land application fee to be paid in a state fiscal year is, as near as possible, \$650,000.00 minus the amount in the fund created under subrule (5) of this rule carried forward from the immediately preceding state fiscal year. Starting with fees to be paid in state fiscal year 1999, the department shall adjust the \$650,000.00 amount annually for inflation using the Detroit consumer price index.

(2) Each biosolids generator and biosolids distributor shall annually report to the department for each state fiscal year, beginning with the 1997 state fiscal year, the number of dry tons of biosolids it generated or the number of dry tons of biosolids in derivatives it distributed that were applied to land in the state of Michigan in the state fiscal year. A biosolids generator that does not land apply shall report zero. A biosolids generator located in the state of Michigan that land applies outside the state of Michigan will be assessed only an administrative fee and a fee for biosolids that are land applied in the state of Michigan. The report is due 30 days after the end of the state fiscal year. By December 15 of each state fiscal year, the department shall determine the generation fee on a per dry ton basis by dividing the cumulative generation fee by the number of dry tons of biosolids applied to land or in derivatives applied to land in the state of Michigan in the immediately preceding state fiscal year. The department shall notify each biosolids generator and biosolids distributor of the generation fee on a per dry ton basis.

(3) A generator or distributor that land-applied biosolids or a derivative to land within the state at any time during the previous state fiscal year shall report to the department the information required in R 323.2413(3) to (8), except R 323.2413(6)(b), (7)(b), and (8)(b), on or before October 30.

(4) By January 31 of each state fiscal year, each biosolids generator or biosolids distributor shall pay its biosolids land application fee. The biosolids generator or biosolids distributor shall determine the amount of its biosolids land application fee by multiplying the number of dry tons of biosolids that it reported under subrule (2) of this rule by the generation fee and adding the administrative fee.

(5) The department of environmental quality shall assess interest on all fee payments submitted under this rule after the due date. The permittee shall pay an additional amount equal to 0.75% of the payment due for each month or portion of a month that the payment remains past due. The failure by a person to pay a fee imposed by this rule in a timely manner is a violation of this part.



(6) The biosolids land application fund is created in the state department of treasury. The department of environmental quality shall forward all fees collected under this rule to the state treasurer for deposit into the fund. The state treasurer may receive money or other assets from any source for deposit into the fund. The state treasurer shall direct the investment of the fund. The state treasurer shall credit to the fund interest and earnings from fund investments. The department of environmental quality shall carry an unexpended balance within the fund at the close of the state fiscal year forward to the following state fiscal year. The department of environmental quality shall ensure that the fund is allocated solely for the administration of this rule and sections 3131 and 3133 of the act, including, but not limited to, education of the farmers, biosolids generators, biosolids distributors, and the general public about land application of biosolids and derivatives and the requirements of this rule and sections 3131 and 3133 of the act. The director of the department may contract with a nonprofit educational organization to administer the educational components of this rule. The state department of treasury shall allocate 10% of the fund to the department of agriculture to provide persons involved in or affected by land application of biosolids or derivatives with education and technical assistance relating to land application of biosolids or derivatives.

History: 1999 AACS.

**R 323.2417 Procedure to determine annual whole biosolids application rate.**

Rule 2417. (1) A person who applies biosolids to the land shall use the following formula to determine the loading rate:

Loading Rate Formula

$$AP = PC \times 0.002 \times AR$$

Where: AP = applied pollutant in pounds per acre.

PC = pollutant concentration in milligrams per kilogram dry weight.

0.002 = the factor to convert pollutant concentration to pounds per dry ton.

AR = the biosolids application rate in dry tons per acre.

(2) R 323.2409(4)(b) requires that the product of the concentration for each pollutant listed in table 4 of R 323.2409(5)(d) in biosolids sold or given away in a bag or other container for application to the land and the annual whole biosolids application rate (AWBAR) for the biosolids not cause the annual pollutant loading rate for the pollutant in table 4 to be exceeded. This rule contains the procedure used to determine the AWBAR for biosolids that do not cause the annual pollutant loading rates in table 4 to be exceeded. The relationship between the annual pollutant-loading rate (APLR) for a pollutant and the annual whole biosolids application rate (AWBAR) for a biosolids is shown in the following equation:

$$APLR = C \times AWBAR \times 0.001 \quad \text{equation (1)}$$

Where: APLR = annual pollutant loading rate in kilograms per hectare per 365-day period.

C = pollutant concentration in milligrams per kilogram of total solids (dry weight basis).

AWBAR = annual whole biosolids application rate in metric tons per hectare per 365-day period (dry weight basis).

0.001 = a conversion factor.

(3) To determine the AWBAR, equation (1) is rearranged into the following equation:

$$\text{AWBAR} = \frac{\text{APLR}}{\text{C} \times 0.001} \quad \text{equation (2)}$$

(4) The procedure used to determine the AWBAR for biosolids is as follows:

(a) Analyze a sample of the biosolids to determine the concentration for each of the pollutants in the biosolids listed in table 4 of R 323.2409(5)(d).

(b) Using the pollutant concentrations from subdivision (a) of this subrule and the APLRs from table 4 of R 323.2409(5)(d), calculate an AWBAR for each pollutant using equation (2) in subrule (3) of this rule.

(c) The AWBAR for the biosolids is the lowest AWBAR calculated in subdivision (b) of the subrule.

History: 1999 AACCS.

### **R 323.2418 Pathogen treatment processes.**

Rule 2418. (1) The process to significantly reduce pathogens (PSRP) is as follows:

(a) Biosolids are agitated with air or oxygen to maintain aerobic conditions for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be between 40 days at 20 degrees Celsius and 60 days at 15 degrees Celsius.

(b) Biosolids are dried on sand beds or on paved or unpaved basins. The biosolids dry for a minimum of 3 months. During 2 of the 3 months, the ambient average daily temperature is above 0 degrees Celsius.

(c) Biosolids are treated in the absence of air for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be between 15 days at 35 to 55 degrees Celsius and 60 days at 20 degrees Celsius.

(d) Using the within-vessel, static aerated pile, or windrow composting method, the temperature of the biosolids is raised to 40 degrees Celsius or higher and remains at 40 degrees Celsius or higher for 5 days. For 4 hours during the 5 days, the temperature in the compost pile exceeds 55 degrees Celsius.

(e) Sufficient lime is added to the biosolids to raise the pH of the biosolids to 12 after 2 hours of contact.

(2) The processes to further reduce pathogens (PFRP) are as follows:

(a) Using either the within-vessel composting method or the static aerated pile composting method, the temperature of the biosolids is maintained at 55 degrees Celsius or higher for 3 days. Using the windrow composting method, the temperature of the

biosolids is maintained at 55 degrees or higher for 15 days or longer. During the period when the compost is maintained at 55 degrees or higher, there shall be a minimum of 5 turnings of the windrow.

(b) Biosolids are dried by direct or indirect contact with hot gases to reduce the moisture content of the biosolids to 10% or lower. Either the temperature of the biosolids particles is more than 80 degrees Celsius or the wet bulb temperature of the gas in contact with the biosolids as the biosolids leaves the dryer is more than 80 degrees Celsius.

(c) Liquid biosolids are heated to a temperature of 180 degrees Celsius or higher for 30 minutes.

(d) Liquid biosolids are agitated with air or oxygen to maintain aerobic conditions and the mean cell residence time of the biosolids is 10 days at 55 to 60 degrees Celsius.

(e) Biosolids are irradiated with beta rays from an accelerator at dosages of at least 1.0 megarad at room temperature (approximately 20 degrees Celsius).

(f) Biosolids are irradiated with gamma rays from certain isotopes, such as <sup>60</sup>Cobalt and <sup>137</sup>Cesium, at dosages of at least 1.0 megarad at room temperature (approximately 20 degrees Celsius).

(g) The temperature of the biosolids is maintained at 70 degrees Celsius or higher for 30 minutes or longer.

History: 1999 AACCS.