61-9.504
Standards for the Use or Disposal of Industrial Sludge

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PART A
General Provisions

504.1. Purpose and applicability.

(a) Purpose

(1) This part establishes standards, which consist of general requirements, pollutant limits, management practices, and operational standards, for the final use or disposal of industrial sludge generated during the treatment of industrial wastewater in a treatment works. Standards are included in this part for industrial sludge applied to the land. Also included in this part are pathogen and alternative vector attraction reduction requirements for industrial sludge applied to the land.

(2) In addition, the standards in this part include the frequency of monitoring and record-keeping requirements when industrial sludge is applied to the land. Also included in this part are reporting requirements for industrial sludge disposal when the sludge is applied to the land.

(b) Applicability

(1) This part applies to any person who prepares industrial sludge or applies industrial sludge to the land. This part also applies to any person who sells, or gives away industrial sludge or materials derived from industrial sludge.

(2) This part applies to industrial sludge applied to the land.

(3) [Reserved]

(4) This part applies to land where industrial sludge is applied and land disposal sites.

(5) The requirements incorporated into this regulation pursuant to State Register Document 4444, including Appendix C, expire and are no longer effective five years from the State Register Document 4444 amendments' effective date.

504.2. Compliance period.

(a) Compliance with the standards in this part shall be implemented in permits issued subsequent to the effective date of the regulation.

(b) [Reserved]

(c) [Reserved]

(d) [Reserved]

(e) Compliance with 504 Appendix C-PCB, shall be required upon publication of the revised regulation in the South Carolina State Register.

504.3. Permits.

(a) The requirements in this part shall be implemented through a permit, with the exception of 504 Appendix C-PCB in accordance with 504.3(b):

(1) [Reserved]

(2) issued to any person who prepares, generates, or disposes of industrial sludge when the industrial sludge is applied to land, or

(3) issued under subtitle C of the Solid Waste Disposal Act; subpart C of the Safe Drinking Water Act; the Marine Protection, Research, and Sanctuaries Act of 1972; or the Clean Air Act.

(4) [Reserved]

(b) Direct Enforceability. In addition to any other requirement of this regulation or a permit, industrial sludge use via land application shall be in accordance with Appendix C-PCB. This includes but is not limited to: bulk sludge applied to agricultural land, forests or public contact sites; sludge sold or given away in a bag or other container for application to the land; domestic septage; reclamation sites; or other materials mixed with sludge before application.

(c) The requirements under this part may be addressed in permits issued to land appliers.

504.4. Relationship to other regulations.

(a) Disposal of industrial sludge in a municipal solid waste landfill unit permitted under R.61-107 constitutes compliance with this regulation. Any person who prepares industrial sludge that is disposed in a municipal solid waste landfill unit shall ensure that the industrial sludge meets the requirements in R.61-107 concerning the quality of materials disposed in a municipal solid waste landfill unit. Disposal of industrial sludge in an industrial solid waste landfill unit complying with State Solid Waste regulations and requirements in permits constitutes compliance with this regulation.

(b) The disposal of industrial sludge involving the composting or co-composting of the industrial sludge with yard trash, land-clearing debris, or a combination of yard trash and land clearing debris shall comply with the requirements established by the Department in R.61-107. The submission and information requirements shall be determined by the Department.

(c) The disposal of industrial sludge utilizing an innovative and experimental solid waste management technology or process shall be permitted under R.61-107.

(d) The disposal of industrial sludge involving firing of industrial sludge in an industrial sludge incinerator or the heat drying/heat conditioning of the industrial sludge shall be permitted under R.61-62.

(e) [Reserved]

504.5. Additional or more stringent requirements.

(a) On a case-by-case basis, the Department may impose requirements in permits for the use or disposal of industrial sludge in addition to or more stringent than the requirements in this part when necessary to protect public health and the environment from any adverse effect of a pollutant in the industrial sludge.

(b) [Reserved]

(c) [Reserved]

(d) [Reserved]

504.6. Exclusions.

(a) Treatment processes. This part does not establish requirements for processes used to treat industrial wastewater or for processes used to treat industrial sludge prior to final use or disposal, except as provided in section 504.32 and section 504.33.

(b) Selection of a use or disposal practice. This part does not require the selection of an industrial sludge use or disposal practice. The determination of the manner in which industrial sludge is used or disposed is a determination by the permittee.

(c) Incineration of industrial sludge. This part does not establish requirements for industrial sludge that is incinerated, including industrial sludge incinerated with other wastes, or with fuels or other materials or for the incinerator in which industrial sludge and other wastes are co-fired.

(1) [Reserved]

(2) [Reserved]

(d) [Reserved]

(e) Hazardous industrial sludge. This part does not establish requirements for the use or disposal of industrial sludge determined to be hazardous in accordance with 40 CFR Part 261.

(f) Industrial sludge with high PCB concentration. This part does not establish requirements and no land application of these materials may occur for the use or disposal of industrial sludge with a concentration of polychlorinated biphenyls (PCBs) equal to or greater than 50 milligrams per kilogram of total solids (dry weight basis). Requirements for land application of sludges (including industrial sludge, sludges and septage that may be mixed with grease trap waste) with PCB concentrations of less than 50 milligrams per kilogram (mg/kg dry weight basis) or less than 50 parts per million (ppm) are included in 504 Appendix C-PCB.

(g) Incinerator ash. This part does not establish requirements for the use or disposal of ash generated during the firing of industrial sludge in an industrial sludge incinerator.

(h) Grit and screenings. This part does not establish requirements for the use or disposal of grit (e.g., sand, gravel, cinders, or other materials with a high specific gravity) or screenings (e.g., relatively large materials such as rags) generated during preliminary treatment of industrial wastewater in a treatment works.

(i) Drinking water treatment sludge. This part does not establish requirements for the use or disposal of sludge generated during the treatment of either surface water or ground water used for drinking water.

(j) [Reserved]

(k) Coal ash. This part does not establish requirements for the use or disposal of coal ash.

(*l*) Grease. This part does not establish requirements for the use or disposal of grease removed from grease traps at restaurants or other similar establishments.

504.7. Requirement for a person who prepares industrial sludge.

Any person who prepares industrial sludge shall ensure that the applicable requirements in this part are met when the industrial sludge is applied to the land.

504.8. Sampling and analysis.

(a) Sampling. Representative samples of industrial sludge that is applied to the land shall be collected and analyzed. The Department may establish minimum requirements in permits for the proper method of sampling and analysis of industrial sludge.

(b) Methods. The materials listed below are incorporated by reference in this part. The materials are incorporated as they exist on the date of approval, and notice of any change in these materials will be published in the Federal Register. Methods in the materials listed below shall be used to analyze samples of industrial sludge, as appropriate.

(1) Enteric viruses. ASTM Designation: D 4994-89, "Standard Practice for Recovery of Viruses From Wastewater Sludges", 1992 Annual Book of ASTM Standards: Section 11 -Water and Environmental Technology, ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

(2) Fecal coliform. Part 9221 C and E. or Part 9222 D., "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, American Public Health Association, 1015 15th Street, NW, Washington, DC, 20005.

(3) Helminth ova. Yanko, W.A., "Occurrence of Pathogens in Distribution and Marketing Municipal Sludges", EPA 600/1-87-014, 1987. National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161 (PB 88-154273/AS).

(4) Inorganic pollutants. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, Second Edition (1982) with Updates I (April 1984) and II (April 1985) and Third Edition (November 1986) with Revision I (December 1987), II, IIA and IIB. Second Edition and Updates I and II are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161 (PB-87-120-291). Third Edition and Revision I are available from Superintendent of Documents, Government Printing Office, 941 North Capitol Street, NE., Washington, DC, 20002 (Document Number 955-001-00000-1).

(5) Salmonella sp. bacteria. Part 9260 D., "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, American Public Health Association, 1015 15th Street, NW, Washington, DC, 20005; or Kenner, B.A. and H.P. Clark, "Detection and enumeration of Salmonella and Pseudomonas aeruginosa", Journal of the Water Pollution Control Federation, Vol. 46, no. 9, September 1974, pp. 2163-2171. Water Environment Federation, 601 Wythe Street, Alexandria, Virginia 22314.

(6) Specific oxygen uptake rate. Part 2710 B., "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, American Public Health Association, 1015 15th Street, NW, Washington, DC, 20005.

(7) Total, fixed, and volatile solids. Part 2540 G., "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, American Public Health Association, 1015 15th Street, NW, Washington, DC, 20005.

504.9. General definitions.

All terms not defined herein have the meaning given them in R.61-9.122, R.61-9.124, R.61-9.129, R.61-9.133, R.61-9.403, or R.61-9.505.

(a) "Apply industrial sludge or industrial sludge applied to the land" means land application of industrial sludge. Disposal of industrial sludge in a permitted solid waste unit or in accordance with a wastewater facility closeout plan approved pursuant to Regulation 61-82 is not land application.

(b) "Base flood" is a flood that has a one percent chance of occurring in any given year (i.e., a flood with a magnitude equalled once in 100 years).

(c) "Cover crop" is a small grain crop, such as oats, wheat, or barley; grasses; or other crop grown for agronomic use.

(d) "CWA" see R.61-9.122.2(b) Definitions.

(e) "Domestic septage" is either liquid or solid material removed from a septic tank, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives industrial wastewater and does not include grease removed from a grease trap at a restaurant.

(f) "Domestic sewage" is waste and wastewater from humans, which is generated from industrial, commercial, or household operations that is discharged to or otherwise enters a treatment works.

(g) "Dry weight basis" means calculated on the basis of having been dried at 105 degrees Celsius until reaching a constant mass (i.e., essentially 100 percent solids content).

(h) "EPA" means the United States Environmental Protection Agency.

(i) "Feed crops" are crops produced primarily for consumption by animals.

(j) "Fiber crops" are crops such as flax and cotton.

(k) "Food crops" are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.

(*l*) "Ground water" is water below the land surface in the saturated zone.

(m) "Industrial wastewater" is wastewater generated in a commercial or industrial process (including waste and wastewater from humans when combined with commercial or industrial wastewater). By definition, waste or wastewater from humans not combined with commercial or industrial wastewater will be considered domestic sewage covered under R.61-9.503.

(n) "Industrial Septage" is either liquid or solid material removed from a septic tank that receives industrial wastewater. This does not include grease removed from grease traps at restaurants or other similar establishments.

(*o*) "Industrial Sludge" is solid, semi-solid, or liquid residue generated during the treatment of industrial wastewater in a treatment works. Industrial sludge includes, but is not limited to, industrial septage; scum

or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from industrial sludge. Industrial sludge does not include ash generated during the firing of industrial sludge in an industrial sludge incinerator or grit and screenings generated during preliminary treatment of industrial wastewater in a treatment works. Industrial sludge by definition does not include sludge covered under 40 CFR Part 503 or R.61-9.503.

(p) "Municipality" see R.61-9.122.2(b) Definitions. The definition includes under R.61-9.503 a special district created under State law, such as a water district, sewer district, sanitary district, utility district, drainage district, or similar entity, or an integrated waste management facility as defined in section 201(e) of the CWA, as amended, that has as one of its principal responsibilities the treatment, transport, use, or disposal of sewage sludge.

(q) "Permitting authority" means the Department.

(r) "Person" see definition in R.61-9.122.2(b) Definitions.

(s) "Person who prepares industrial sludge" is the person who generates industrial sludge during the treatment of industrial wastewater in a treatment works and/or the person who derives a material from industrial sludge when the industrial sludge does not meet the ceiling concentrations in Table 1 of section 504.13; the pollutant concentrations Table 3 of section 504.13; the Class A pathogen requirements in section 504.32(a); one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement (as determined by the Department), or the sludge contains other pollutants that may cause a public health or environmental problem.

(t) "Place industrial sludge or industrial sludge placed" means disposal of industrial sludge on a land disposal site.

(u) "Pollutant" is 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 Department, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction), or physical deformations in either organisms or offspring of the organisms.

(v) "Pollutant limit" is a numerical value that describes the amount of a pollutant allowed per unit amount of industrial sludge (e. g., milligrams per kilogram of total solids); the amount of a pollutant that can be applied to a unit area of land (e. g., kilograms per hectare); or the volume of a material that can be applied to a unit area of land (e.g., gallons per acre).

(w) "Runoff" is rainwater, leachate, or other liquid that drains overland on any part of a land surface and runs off of the land surface.

(x) "State" means the State of South Carolina.

(y) "Store or storage of industrial sludge" is the placement of industrial sludge on land on which the industrial sludge remains for two years or less. This does not include the placement of industrial sludge on land for treatment.

(z) "Treat or treatment of industrial sludge" is the preparation of industrial sludge for final use or disposal. This includes, but is not limited to, thickening, stabilization, and dewatering of industrial sludge. This does not include storage of industrial sludge.

(aa) “Treatment works” is either a commercially, or privately owned device or system used to treat (including recycle and reclaim) either industrial, commercial sewage or a combination of domestic sewage and industrial waste of a liquid nature.

(bb) “Wetlands” see R.61-9.122.2(b) Definitions.

(cc) “Commercial Wastewater” is any other wastewater (other than process wastewater) which is not included under industrial wastewater and does not include domestic sewage (e.g. centralized special waste collection and processing).

(dd) “Person who applies industrial sludge” may be the generator, preparer, or a land applier.

PART B
LAND APPLICATION

504.10. Applicability.

(a) This part applies to any person who prepares industrial sludge that is applied to the land, to any person who applies industrial sludge to the land, to industrial sludge applied to the land, and to the land on which industrial sludge is applied.

(b) Bulk industrial sludge

(1) [Reserved]

(2) The Department may apply any or all of the general requirements in section 504.12 and the management practices in section 504.14 to bulk industrial sludge meeting the ceiling concentrations in Table 1 of section 504.13 and the pollutant concentrations in Table 3 of section 504.13; the Class A pathogen requirements in section 504.32(a), and one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement (as determined by the Department), on a case-by-case basis after determining that the general requirements or management practices are needed to protect public health and the environment from any reasonably anticipated adverse effect that may occur from any pollutant in the bulk industrial sludge.

(c)(1) [Reserved]

(2) The Department may apply any or all of the general requirements in section 504.12 and the management practices in section 504.14 to a derived bulk material meeting the ceiling concentrations in Table 1 of section 504.13 and the pollutant concentrations in Table 3 of section 504.13; the Class A pathogen requirements in section 504.32(a) and one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement (as determined by the Department), on a case-by-case basis after determining that the general requirements or management practices are needed to protect public health and the environment from any reasonably anticipated adverse effect that may occur from any pollutant in the bulk industrial sludge.

(d) The requirements in this part may be applied by the Department, on a case-by-case basis, when a bulk material derived from industrial sludge is applied to the land if the industrial sludge from which the bulk material is derived meets the ceiling concentrations in Table 1 of section 504.13; the pollutant concentrations in Table 3 of section 504.13; the Class A pathogen requirements in section 504.32(a); one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an

equivalent vector attraction reduction requirement (as determined by the Department), and does not contain other pollutants that may cause a public health or environmental problem.

(e) Industrial sludge sold or given away in a bag or other container for application to the land. The general requirements in section 504.12 and the management practices in section 504.14 do not apply, except for section 504.12(*o*), section 504.12(p), section 504.12(q), and section 504.14(e), when industrial sludge is sold or given away in a bag or other container for application to the land if the industrial sludge sold or given away in a bag or other container for application to the land meets the ceiling concentrations in Table 1 of section 504.13; the pollutant concentrations Table 3 of section 504.13; the Class A pathogen requirements in section 504.32(a), and one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement (as determined by the Department).

(f) The general requirements in section 504.12 and the management practices in section 504.14 do not apply, except for section 504.12(*o*), section 504.12(p), section 504.12(q), and section 504.14(e), when a material derived from industrial sludge is sold or given away in a bag or other container for application to the land if the derived material meets the ceiling concentrations in Table 1 of section 504.13; the pollutant concentrations in Table 3 of section 504.13; the Class A pathogen requirements in section 504.32(a), and one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement (as determined by the Department).

(g) The requirements in this part do not apply, except for section 504.14(e), when a material derived from industrial sludge is sold or given away in a bag or other container for application to the land if the industrial sludge from which the material is derived meets the ceiling concentrations in Table 1 of section 504.13; the pollutant concentrations in Table 3 of section 504.13; the Class A pathogen requirements in section 504.32(a); one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8)or an equivalent vector attraction reduction requirement (as determined by the Department), and does not contain other pollutants that may cause a public health or environmental problem.

(h) If other materials are mixed with the industrial sludge, the final product must meet the applicable requirements related to pollution limits (in section 504.13), pathogen reduction (in section 504.15(a)) when pathogens are expected to be present and vector attraction reduction (in section 504.15(c)) when the industrial sludge is expected to attract vectors, after the materials have been added to the industrial sludge.

504.11. Special definitions.

(a) “Agricultural land” is land on which a food crop, a feed crop, or a fiber crop is grown. This includes range land and land used as pasture.

(b) “Agronomic rate” is the whole sludge application rate (dry weight basis) designed: (1) to provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on the land and (2) to minimize the amount of nitrogen in the industrial sludge that passes below the root zone of the crop or vegetation grown on the land to the ground water and (3) to provide the amount of other organic and inorganic plant nutrients which promote crop or vegetative growth, such as calcium-carbonate equivalency.

(c) “Annual pollutant loading rate” is the maximum amount of a pollutant that can be applied to a unit area of land during a 365 day period.

(d) “Annual whole sludge application rate” is the maximum amount of industrial sludge (dry weight basis) that can be applied to a unit area of land during a 365 day period.

(e) “Bulk industrial sludge” is industrial sludge that is not sold or given away in a bag or other container for application to the land.

(f) “Cumulative pollutant loading rate” is the maximum amount of an inorganic pollutant that can be applied to an area of land.

(g) “Forest” is a tract of land thick with trees and underbrush.

(h) “Land application” is the spraying or spreading of industrial sludge onto the land surface; the injection of industrial sludge below the land surface; or the incorporation of industrial sludge into the soil so that the industrial sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

(i) “Monthly average” is the arithmetic mean of all measurements taken during the month.

(j) “Other container” is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

(k) “Pasture” is land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.

(*l*) “Public contact site” is land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

(m) “Range land” is open land with indigenous vegetation.

(n) “Reclamation site” is drastically disturbed land that is reclaimed using industrial sludge. This includes, but is not limited to, strip mines and construction sites.

504.12. General requirements.

(a) No person shall apply industrial sludge to the land except in accordance with the requirements in this part.

(b) No person shall apply bulk industrial sludge subject to the cumulative pollutant loading rates in section 504.13(b)(2) to agricultural land, forest, a public contact site, or a reclamation site if any of the cumulative pollutant loading rates in section 504.13(b)(2) has been reached.

(c) [Reserved]

(d) The person who prepares bulk industrial sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall provide the person who applies the bulk industrial sludge written notification of the concentration of total nitrogen (as N on a dry weight basis) in the bulk industrial sludge.

(e)(1) The person or the permittee who applies industrial sludge to the land shall obtain information needed to comply with the requirements in this part.

(2)(i) Before bulk industrial sludge subject to the cumulative pollutant loading rates in section 504.13(b)(2) is applied to the land, the person who proposes to apply the bulk industrial sludge shall contact the Department to determine whether bulk industrial sludge subject to the cumulative pollutant loading rates in section 504.13(b)(2) has been applied to the site.

(ii) If bulk industrial sludge subject to the cumulative pollutant loading rates in section 504.13(b)(2) has not been applied to the site, the cumulative amount for each pollutant listed in Table 2 of section 504.13 may be applied to the site in accordance with section 504.13(a)(2)(i).

(iii) If bulk industrial sludge subject to the cumulative pollutant loading rates in section 504.13(b)(2) has been applied to the site and the cumulative amount of each pollutant applied to the site in the bulk industrial sludge is known, the cumulative amount of each pollutant applied to the site shall be used to determine the additional amount of each pollutant that can be applied to the site in accordance with section 504.13(a)(2)(i).

(iv) If bulk industrial sludge subject to the cumulative pollutant loading rates in section 504.13(b)(2) has been applied to the site since July 20, 1993 and the cumulative amount of each pollutant applied to the site in the bulk industrial sludge since that date is not known, an additional amount of each pollutant shall not be applied to the site in accordance with section 504.13(a)(2)(i).

(f) When a person who prepares bulk industrial sludge provides the bulk industrial sludge to a person who applies the bulk industrial sludge to the land, the person who prepares the bulk industrial sludge shall provide the person who applies the industrial sludge notice and necessary information to comply with the requirements in this part.

(g) When a person who prepares industrial sludge provides the industrial sludge to another person who prepares the industrial sludge, the person who provides the industrial sludge shall provide the person who receives the industrial sludge notice and necessary information to comply with the requirements in this part.

(h) The person who applies bulk industrial sludge to the land shall provide the owner or lease holder of the land on which the bulk industrial sludge is applied notice and necessary information to comply with the requirements in this part.

(i) Any person who prepares outside the State bulk industrial sludge that is applied to land in South Carolina or who prepares in the State bulk industrial sludge that is applied to land in another state shall provide written notice, prior to the initial application of bulk industrial sludge to the land application site by the applier, to the Department. For bulk industrial sludge prepared outside the State and applied to land in the state, the notice shall include:

(1) The location, by either street address or latitude and longitude, of each land application site.

(2) The approximate time period bulk industrial sludge will be applied to the site.

(3) The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who prepares the bulk industrial sludge.

(4) The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk industrial sludge.

For use or land disposal outside the state, the notice shall include information showing the acceptance of the bulk industrial sludge for land application by the appropriate person(s). This information may be in the form of copies of permits or approvals, letters from the appropriate permitting authority, or an acceptance letter from the person agreeing to land apply the bulk industrial sludge.

(j) Any person who applies bulk industrial sludge subject to the cumulative pollutant loading rates in section 504.13(b)(2) to the land shall provide written notice, prior to the initial application of bulk industrial sludge to a land application site by the applier, to the Department and the Department shall retain and provide access to the notice. The notice shall include:

(1) The location, by either street address or latitude and longitude, of the land application site.

(2) The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) of the person who will apply the bulk industrial sludge.

(k) The Department may establish additional restrictions in permits based upon soil and groundwater conditions to insure protection of the groundwater and surface water of the State. Criteria may include but is not limited to soil permeability, clay content, and depth to groundwater.

(*l*) The Department may establish in permits the application buffer setbacks for property boundaries, roadways, residential developments, dwellings, water wells, drainageways, and surface water as deemed necessary to protect public health and the environment. Factors taken into consideration in the establishment of setbacks would indicate sludge application method, adjacent land usage, public access, aerosols, runoff prevention, and adjacent groundwater usage.

(m) The Department may establish permit conditions to require that the agronomic rate of sludge application remain consistent with the lime and fertilizer requirements for the cover, feed, food, and fiber crops based on published lime and fertilizer recommendations (such as "Nutrient Management for South Carolina", Cooperative Extension Service, Clemson University, EC 476).

(n) The Department may establish minimum requirements in permits for soil and/or groundwater monitoring, for bulk application sites, to verify compliance with this Regulation. Factors taken into consideration in the establishment of soil and groundwater monitoring will include groundwater depth, operation flexibility, application frequency, type of sludge, size of application area, and loading rate.

(1) The Department may establish pre-application and post-application site monitoring requirements in permits for limiting nutrients or limiting pollutants as determined by the Department.

(2) The Department may establish permit conditions which require the permittee to reduce, modify, or eliminate the sludge applications based on the results of this data.

(3) The Department may modify or revoke and reissue or revoke the permit based on this data.

(*o*) Any person who prepares bulk industrial sludge and applies it to the land, or provides the bulk industrial sludge to a person who applies the bulk industrial sludge, or provides the bulk industrial sludge to another person who treats or processes the bulk industrial sludge prior to land applying it, shall apply to the Department for a permit to land apply the bulk industrial sludge and shall receive a valid permit from the Department prior to the actual application. Any person who prepares industrial sludge and sells or gives it away in a bag or other container, or provides the industrial sludge to a person who sells or gives it away in a bag or other container, or provides the industrial sludge to another person who treats, mixes, alters or processes the industrial sludge for sale or gives it away in a bag or other container shall receive a valid permit from the Department prior to the sale or distribution of the material. The application for land applying sludges, or bagging, or selling, or giving away sludges will be in the form of a report prepared by a qualified Professional Engineer, qualified soil scientist, qualified agronomist, or other qualified individual. This report shall at a minimum contain:

(1) Sludge generator information shall be included as follows:

(i) Facility name, address, telephone number, county, and NPDES or other permit number (if applicable).

(ii) Plant discharge capacity in millions of gallons per day (MGD) (if applicable), amount of sludge generated per year (dry weight basis), description of sludge storage and amount of stockpiled sludge (if applicable), description of sludge treatment, and current method of disposal.

(2) Sludge analysis information shall be included as follows:

(i) Test results or rationale that demonstrates the non-hazardous nature of the sludge to the satisfaction of the Department.

(ii) Name, address, lab certification number, and telephone number of the laboratory conducting the analyses.

(iii) Sludge shall be analyzed for:

(A) Total solids (mg/l) and volatile solids (mg/kg).

(B) Nutrients (dry weight basis).

(1) Total Kjeldahl Nitrogen (mg/kg).

(2) Total inorganic nitrogen (mg/kg).

(3) Total ammonia nitrogen (mg/kg) and Total nitrate nitrogen (mg/kg).

(4) Total phosphorus (mg/kg).

(5) Total potassium (mg/kg).

(6) Calcium Carbonate Equivalency (if industrial sludge is alkaline stabilized).

(C) Pollutants (dry weight basis).

(1) Arsenic (mg/kg).

(2) Cadmium (mg/kg).

(3) Copper (mg/kg).

(4) lead (mg/kg).

(5) Mercury (mg/kg).

(6) Molybdenum (mg/kg).

(7) Nickel (mg/kg).

(8) Selenium (mg/kg).

(9) Zinc (mg/kg).

(10) Other compounds required by the permit or any pollutant required for monitoring under effluent guidelines (40 CFR Part 136; Subchapter N (40 CFR Parts 400 through 402 and 404 through 471)) may be required to be monitored for in the industrial sludge (if applicable).

(D) If an analysis must be performed on the sludge to document compliance with pathogen reduction requirements and vector attraction reduction requirements, these analyses shall be submitted in the report along with an explanation.

(iv) Sludge handling and application information shall be included as follows:

(A) Description of method of transport (if applicable).

(B) The time of year of the sludge application and how it relates to crop planting and harvesting schedule (if applicable).

(C) Name, address, and telephone number of the contractor applying the sludge (if applicable).

(D) Type of equipment used to spread the sludge (if applicable).

(v) Application site information shall be included (as appropriate):

(A) Name and address of landowner and location of application site(s).

(B) Name and address of the party managing the site(s) (if different than the owner).

(C) Previous years when sludge was applied and application amounts (when sludge was applied under permits issued by the Department).

(D) Additional soil additives applied on the site(s).

(E) Description of method to control access to the site(s).

(F) Method of odor control (if applicable).

(G) Site location(s) on maps including:

(1) Topography and drainage characteristics.

(2) Adjacent land usage and location of inhabited dwellings.

(3) All water supply wells on adjacent property.

(4) Adjacent surface water bodies.

(5) Sludge use boundaries and buffer zones.

(6) Location of proposed groundwater monitoring wells (if applicable).

(7) Right-of-Ways

(8) Soil test, description of soil types, and boring locations (if applicable).

(vi) Site Monitoring Plan information shall be included as follows (when required):

(A) Groundwater monitoring information (if applicable).

(B) Soil monitoring methods and locations (if applicable).

(C) Surface water sampling methods and locations (if applicable).

(D) Metals testing, if required, due to previous application(s) (if applicable).

(E) Method to insure that the soil pH will remain within agronomic ranges during the life of the site (e.g. alkaline stabilized sludge projects).

(vii) The Department, at its discretion, may identify specific application information that may be excluded from a submission if the applicant has an alternate permitted method of disposal for the bulk industrial sludge (e.g. a municipal or industrial solid waste landfill disposal permit). The Department, may allow an applicant to exclude application information from a submission of a modified application or addition to a previously permitted activity.

(p) The Department, at its discretion, may request of an applicant any additional information deemed necessary to complete or correct deficiencies in the sludge disposal permit application before processing the application or issuing or denying the issuance of a permit.

(q) Applicants for land application of sludge must submit their applications on permit application forms if designated by the Department.

(r) If a deleterious impact to the groundwaters of the State from industrial sludge use or disposal practices is documented, through groundwater monitoring levels exceeding the standards set forth in R.61-68 or a significant adverse trend occurs, then it will be the obligation of the generator/preparer of the industrial sludge as directed by the Department to conduct an investigation to determine the vertical and horizontal extent of groundwater impact. The Department may require remediation of the groundwater to within acceptable levels for groundwater as set forth in R.61-68.

504.13. Pollutant limits.

(a) Industrial sludge

(1) Bulk industrial sludge or industrial sludge sold or given away in a bag or other container shall not be applied to the land if the concentration of any pollutant in the industrial sludge exceeds the ceiling concentration for the pollutant in Table 1 of section 504.13. However, the Department may allow, on a case-by-case basis, the application of bulk industrial sludge to the land when the concentration of any pollutant in the industrial sludge exceeds the ceiling concentration for the pollutant in Table 1 of section 504.13 provided the application rate is at or below the agronomic rates as defined by section 504.11(b). It must be clearly demonstrated to the Department’s satisfaction that no adverse impact to public health or the environment will occur in these situations. Additional requirements in permits on management, operational

standards, site restrictions, frequency of monitoring, recordkeeping, and reporting may be imposed in the these situations.

(2) If bulk industrial sludge is applied to agricultural land, forest, a public contact site, or a reclamation site, either:

(i) the cumulative loading rate for each pollutant shall not exceed the cumulative pollutant loading rate for the pollutant in Table 2 of section 504.13; or

(ii) the concentration of each pollutant in the industrial sludge shall not exceed the concentration for the pollutant in Table 3 of section 504.13.

(3) If bulk industrial sludge is applied to a lawn or a home garden, the concentration of each pollutant in the industrial sludge shall not exceed the concentration for the pollutant in Table 3 of section 504.13.

(4) If industrial sludge is sold or given away in a bag or other container for application to the land, either:

(i) the concentration of each pollutant in the industrial sludge shall not exceed the concentration for the pollutant in Table 3 of section 504.13, or

(ii) the product of the concentration of each pollutant in the industrial sludge and the annual whole sludge application rate for the industrial sludge shall not cause the annual pollutant loading rate for the pollutant in Table 4 of section 504.13 to be exceeded. The procedure used to determine the annual whole sludge application rate is presented in appendix A of this part.

(5) The Department may determine on a case-by-case basis that an industrial sludge due to its pollutant content or pollutant concentration may not be land applied or sold or given away.

(b) Pollutant concentrations and loading rates -industrial sludge.

(1) Ceiling concentrations

TABLE 1 OF SECTION 504.13—CEILING CONCENTRATIONS

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

(2) Cumulative pollutant loading rates

TABLE 2 OF SECTION 504.13—CUMULATIVE POLLUTANT LOADING RATES

Pollutant	Cumulative Pollutant Loading Rate (kilograms per hectare)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	100
Zinc	2800

(3) Pollutant concentrations

TABLE 3 OF SECTION 504.13—POLLUTANT CONCENTRATIONS

Pollutant	Monthly Average Concentrations (milligrams per kilogram) Dry weight basis
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	100
Zinc	2800

(4) Annual pollutant loading rates

TABLE 4 OF SECTION 504.13—ANNUAL POLLUTANT LOADING RATES

Pollutant	Annual Pollutant Loading Rate (kilograms per hectare per 365 day period)
Arsenic	2.0
Cadmium	1.9
Copper	75
Lead	15
Mercury	0.85
Nickel	21
Selenium	5.0
Zinc	140

(c) [Reserved]

(d) Additional parameters may be required, from the application information or subsequent monitoring, in a permit thereafter, but such needs will be assessed on an individual project basis. Any pollutant required for monitoring under effluent guidelines (40 CFR 136; Subchapter N (40 CFR Part 400 through 402 and 404 through 471)) may be required to be monitored (in permits) for in the industrial sludge.

504.14. Management practices.

(a) [Reserved]

(b) Bulk industrial sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk industrial sludge enters a wetland or other waters of the State, as defined in R.61-9.122.2, except as provided in a permit issued pursuant to section 402 or 404 of the CWA.

(c) Bulk industrial sludge shall not be applied to agricultural land, forest, or a reclamation site that is 10 meters or less from waters of the State, as defined in R.61-9.122.2, unless otherwise specified by the Department.

(d) Bulk industrial sludge shall be applied to agricultural land, forest, a public contact site, or a reclamation site at a whole sludge application rate that is equal to or less than the agronomic rate for the bulk industrial sludge, unless, in the case of a reclamation site, otherwise specified by the Department.

(e) Either a label shall be affixed to the bag or other container in which industrial sludge that is sold or given away for application to the land, or an information sheet shall be provided to the person who receives industrial sludge sold or given away in an other container for application to the land. The label or information sheet shall contain the following information:

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

(2) A statement that application of the industrial sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

(3) The annual whole sludge application rate for the industrial sludge that does not cause any of the annual pollutant loading rates in Table 4 of section 504.13 to be exceeded.

(4) The annual whole sludge application rate for the industrial sludge that does not cause the agronomic rate for appropriate crops to be exceeded (to be presented in tons/acre or other units approved by the Department).

(f) Screening of industrial septage is required prior to land application. The screenings must be disposed of properly (e.g. municipal waste landfill).

504.15. Operational standards - pathogens and vector attraction reduction.

(a) Pathogens -industrial sludge

(1) If pathogens are expected to be present, the Class A pathogen requirements in section 504.32(a) or the Class B pathogen requirements and site restrictions in section 504.32(b) shall be met when bulk industrial sludge is applied to agricultural land, forest, a public contact site, or a reclamation site.

(2) If pathogens are expected to be present, the Class A pathogen requirements in section 504.32(a) shall be met when bulk industrial sludge is applied to a lawn or a home garden.

(3) If pathogens are expected to be present, the Class A pathogen requirements in section 504.32(a) shall be met when industrial sludge is sold or given away in a bag or other container for application to the land.

(b) [Reserved]

(c) Vector attraction reduction -industrial sludge

(1) When the industrial sludge is expected to attract vectors, one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8); a requirement that is equivalent to one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504(b)(8), as determined by the Department; or the vector attraction reduction requirements in section 504.33(b)(9) or (b)(10) shall be met when bulk industrial sludge is applied to agricultural land, forest, a public contact site, or a reclamation site.

(2) When the industrial sludge is expected to attract vectors, one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement, as determined by the Department, shall be met when bulk industrial sludge is applied to a lawn or a home garden.

(3) When the industrial sludge is expected to attract vectors, one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement, as determined by the Department, shall be met when industrial sludge is sold or given away in a bag or other container for application to the land.

(d) [Reserved]

504.16. Frequency of monitoring.

(a) Industrial sludge

(1) The frequency of monitoring for the pollutants listed in Table 1, Table 2, Table 3 and Table 4 of section 504.13 and other pollutants listed in a NPDES or land application permit; when pathogens are expected to be present, the pathogen density requirements in section 504.32(a) and in section 504.32(b)(2) through section 504.32(b)(4); and when the industrial sludge is expected to attract vectors, the vector attraction reduction requirements section 504.33(b)(1) through section 504.33(b)(4) and section 504.33(b)(6) through section 504.33(b)(8) shall be the frequency in Table 1 of section 504.16.

TABLE 1 OF SECTION 504.16—FREQUENCY OF MONITORING—LAND APPLICATION

Amount of industrial sludge* (metric tons per 365 day period)	Frequency
Greater than zero but less than 1,500.	Once per quarter** (four times per year)
Equal to or greater than 1,500 but less than 15,000.	Once per 60 days

Amount of industrial sludge* (metric tons per 365 day period)	Frequency
	(six times per year)
Equal to or greater than 15,000.	Once per month (12 times per year)

*Either the amount of bulk industrial sludge applied to the land or the amount of industrial sludge received by a person who prepares industrial sludge that is sold or given away in a bag or other container for application to the land (dry weight basis).

**Facilities which generate less than 290 metric tons of sludge per year and land apply the sludge once per year or less only have to monitor once per year.

(2) After the industrial sludge has been monitored for two years at the frequency in Table 1 of section 504.16, the Department may reduce the frequency of monitoring for pollutant concentrations, for the pathogen density requirements in section 504.32(a)(5)(ii) and section 504.32(a)(5)(iii), if applicable, and for the vector attraction reduction requirements section 504.33(b)(1) through section 504.33(b)(8), if applicable.

(b) [Reserved]

504.17. Recordkeeping.

(a) Industrial sludge

(1) The person who prepares the industrial sludge in section 504.10(b)(2) or in section 504.10(e) shall develop the following information and shall retain the information for five years:

(i) The concentration of each pollutant listed in Table 3 of section 504.13 and other pollutants listed in a NPDES or land application permit in the industrial sludge.

(ii) [Reserved]

(iii) If pathogens are expected to be present, a description of how the Class A pathogen requirements in section 504.32(a) are met.

(iv) When the industrial sludge is expected to attract vectors, a description of how one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement, as determined by the Department, is met.

(2) The person who derives the material in section 504.10(f) shall develop the following information and shall retain the information for five years:

(i) The concentration of each pollutant listed in Table 3 of section 504.13 and other pollutants listed in a NPDES or land application permit in the material.

(ii) [Reserved]

(iii) If pathogens are expected to be present, a description of how the Class A pathogen requirements in section 504.32(a) are met.

(iv) When the industrial sludge is expected to attract vectors, a description of how one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement, as determined by the Department, is met.

(3) If the pollutant concentrations in section 504.13(b)(3), the Class A pathogen requirements in section 504.32(a), and the vector attraction reduction requirements in either section 504.33(b)(9) or section 504.33(b)(10) are met when bulk industrial sludge is applied to agricultural land, forest, a public contact site, or a reclamation site:

(i) The person who prepares the bulk industrial sludge shall develop the following information and shall retain the information for five years.

(A) The concentration of each pollutant listed in Table 3 of section 504.13 and other pollutants listed in a NPDES or land application permit in the bulk industrial sludge.

(B) [Reserved]

(C) If pathogens are expected to be present, a description of how the pathogen requirements in section 504.32(a) are met.

(ii) The person who applies the bulk industrial sludge shall develop the following information and shall retain the information for five years.

(A) [Reserved]

(B) A description of how the management practices in section 504.14 are met for each site on which bulk industrial sludge is applied.

(C) If the industrial sludge is expected to attract vectors, a description of how the vector attraction reduction requirements in either section 504.33(b)(9) or section 504.33(b)(10) are met for each site on which bulk industrial sludge is applied.

(4) If the pollutant concentrations in section 504.13(b)(3) and the Class B pathogen requirements in section 504.32(b) are met when bulk industrial sludge is applied to agricultural land, forest, a public contact site, or a reclamation site:

(i) The person who prepares the bulk industrial sludge shall develop the following information and shall retain the information for five years:

(A) The concentration of each pollutant listed in Table 3 of section 504.13 and other pollutants listed in a NPDES or land application permit in the bulk industrial sludge.

(B) [Reserved]

(C) If pathogens are expected to be present, a description of how the Class B pathogen requirements in section 504.32(b) are met.

(D) When one of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8) is met, a description of how the vector attraction reduction requirement is met.

(ii) The person who applies the bulk industrial sludge shall develop the following information and shall retain the information for five years.

(A) [Reserved]

(B) A description of how the management practices in section 504.14 are met for each site on which bulk industrial sludge is applied.

(C) A description of how the site restrictions in section 504.32(b)(5) are met for each site on which bulk industrial sludge is applied.

(D) When the vector attraction reduction requirement in either section 504.33(b)(9) or section 504.33(b)(10) is met, a description of how the vector attraction reduction requirement is met.

(5) If the requirements in section 504.13(a)(2)(i) are met when bulk industrial sludge is applied to agricultural land, forest, a public contact site, or a reclamation site:

(i) The person who prepares the bulk industrial sludge shall develop the following information and shall retain the information for five years.

(A) The concentration of each pollutant listed in Table 1 of section 504.13 and other pollutants listed in a NPDES or land application permit in the bulk industrial sludge.

(B) [Reserved]

(C) If pathogens are expected to be present, a description of how the pathogen requirements in either section 504.32(a) or section 504.32(b) are met.

(D) When one of the vector attraction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement, as determined by the Department, is met, a description of how the vector attraction requirement is met.

(ii) The person who applies the bulk industrial sludge shall develop the following information, retain the information in section 504.17(a)(5)(ii)(A) through section 504.17(a)(5)(ii)(G) indefinitely, and retain the information in section 504.17(a)(5)(ii)(H) through section 504.17(a)(5)(ii)(M) for five years.

(A) The location, by either street address or latitude and longitude, of each site on which bulk industrial sludge is applied.

(B) The number of hectares in each site on which bulk industrial sludge is applied.

(C) The date bulk industrial sludge is applied to each site.

(D) The cumulative amount of each pollutant (i.e., kilograms) listed in Table 2 of section 504.13 in the bulk industrial sludge applied to each site, including the amount in section 504.12(e)(2)(iii).

(E) The amount of industrial sludge (i.e., metric tons) applied to each site.

(F) [Reserved]

(G) A description of how the requirements to obtain information in section 504.12(e)(2) are met.

(H) [Reserved]

(I) A description of how the management practices in section 504.14 are met for each site on which bulk industrial sludge is applied.

(J) [Reserved]

(K) A description of how the site restrictions in section 504.32(b)(5) are met for each site on which Class B bulk industrial sludge is applied.

(L) [Reserved]

(M) If the vector attraction reduction requirements in either section 504.33(b)(9) or section 504.33(b)(10) are met, a description of how the requirements are met.

(6) If the requirements in section 504.13(a)(4)(ii) are met when industrial sludge is sold or given away in a bag or other container for application to the land, the person who prepares the industrial sludge that is sold or given away in a bag or other container shall develop the following information and shall retain the information for five years:

(i) The annual whole sludge application rate for the industrial sludge that does not cause the annual pollutant loading rates in Table 4 of section 504.13 to be exceeded.

(ii) The concentration of each pollutant listed in Table 4 of section 504.13 and other pollutants listed a NPDES or land application permit in the industrial sludge.

(iii) [Reserved]

(iv) If pathogens are expected to be present, a description of how the Class A pathogen requirements in section 504.32(a) are met.

(v) When the industrial sludge is expected to attract vectors, a description of how one of the vector attraction requirements in section 504.33(b)(1) through section 504.33(b)(8) or an equivalent vector attraction reduction requirement, as determined by the Department, is met.

(b) [Reserved]

504.18. Reporting.

(a) Any generator of industrial sludge that is applied to the land, any person who prepares industrial sludge that is applied to the land, or any person who applies industrial sludge to the land shall submit the following information to the Department:

(1) The information in section 504.17(a), except the information in section 504.17(a)(3)(ii), section 504.17(a)(4)(ii) and in section 504.17(a)(5)(ii), for the appropriate requirements on or before February 19 of each year, for the period of January 1 through December 31 of the previous calendar year.

(2) The information in section 504.17(a)(5)(ii)(A) through section 504.17(a)(5)(ii)(G) on or before February 19 of each year, for the period of January 1 through December 31 of the previous calendar year

when 90 percent or more of any of the cumulative pollutant loading rates in Table 2 of section 504.13 is reached at a site.

(b) [Reserved]

PART C
LAND DISPOSAL

504.20. Applicability.

(a) This part applies to any person who prepares industrial sludge that is placed on a land disposal site, to the owner/operator of a land disposal site, to industrial sludge placed on a land disposal site, and to a land disposal site.

(b) This part does not apply to industrial sludge stored on the land or to the land on which industrial sludge is stored. It also does not apply to industrial sludge that remains on the land for longer than two years when the person who prepares the industrial sludge demonstrates that the land on which the industrial sludge remains is not an active industrial sludge unit. The demonstration shall include the following information, which shall be retained by the person who prepares the industrial sludge for the period that the industrial sludge remains on the land:

(1) The name and address of the person who prepares the industrial sludge.

(2) The name and address of the person who either owns the land or leases the land.

(3) The location, by either street address or latitude and longitude, of the land.

(4) An explanation of why industrial sludge needs to remain on the land for longer than two years prior to final use or disposal.

(5) The approximate time period when the industrial sludge will be used or disposed.

(c) This part does not apply to industrial sludge treated on the land or to the land on which industrial sludge is treated.

(d) This part does not apply to industrial sludge that is allowed to remain in a closed wastewater treatment facility when the facility is closed in accordance with Regulation 61-82. For example, this part does not apply when the Department has approved a wastewater treatment lagoon closure which includes draining the lagoon and then leaving the sludge in place and disking it into the soil, and then filling the lagoon with suitable material or leveling the dikes.

504.21. Special definitions.

(a) “Active industrial sludge unit” is an industrial sludge unit that has not closed.

(b) “Industrial sludge unit” is land on which industrial sludge is placed for final disposal. This does not include land on which industrial sludge is either stored or treated. Land does not include waters of the State, as defined in R.61-9.122.2, and does not include beneficial use activities covered under Part B which comply with agronomic rate requirements and metals limitations or other bulk industrial sludge land application activities permitted on a case-by-case basis under Part B (504.13(a)(1)).

(c) “Land disposal site” is an area of land that contains one or more active industrial sludge units.

504.22. General requirements.

(a) No person shall place industrial sludge on an active industrial sludge unit unless the requirements in this part are met.

(1) The following activities or conditions constitute land disposal (unless the Department has issued a permit or granted approval for the specific activity):

(i) Storage of industrial sludge in sludge storage units, excluding sludge treatment, for more than two (2) years constitutes land disposal.

(ii) The design storage capacity of industrial sludge storage units will not be permitted to exceed two (2) years at the treatment plant design conditions, or

(iii) Accumulation of industrial sludge in a treatment works to greater than fifty (50) percent of the capacity of the unit or to an average depth of greater than design depth constitutes land disposal of sludge under this regulation, or

(iv) Accumulation of industrial sludge that adversely impacts the overall treatment works operation and maintenance or results in an excessive sludge inventory, may result in a facility being identified as a land disposal site.

(2) For any facility, except a landfill or a sludge only monofill, meeting the definition of a land disposal site on the date of this regulation, either sufficient amount of sludge must be removed from the facility in order to change the facility’s classification, or a report detailing final closure must be submitted to the Bureau of Water, Department of Health and Environmental Control or an application for permitting under Solid Waste Regulations must be submitted to the Bureau of Land and Waste Management, Department of Health and Environmental Control. Either the sludge removal must be accomplished within one year after the date of this regulation or the closeout report or permit application must be submitted to the Department within one (1) year after the date of this regulation. If closure is the selected option, the plan must provide a schedule showing how the closure will be accomplished. The land disposal site must be either closed under Regulation 61-82 or permitted by Solid Waste Management Regulations by June 28, 2001. Facilities will be in compliance with this section if a timely and complete application for closure or permit is made and through no fault of the applicant a closure approval or permit has not been issued.

(3) [Reserved]

(b) [Reserved]

(c) [Reserved]

(d) The owner of a land disposal site in existence on or before the effective date of this regulation and then closed shall provide written notification to the subsequent owner of the site that industrial sludge was placed on the land.

(e) Land disposal of sludge in a landfill, including sludge only monofills, shall comply with State Solid Waste regulations and requirements in permits.

(f) [Reserved]

(g) [Reserved]

(h) New land disposal sites must be permitted under the provisions of Solid and Hazardous Waste Regulations prior to operation.

PART D
PATHOGENS AND VECTOR ATTRACTION REDUCTION

504.30. Scope.

(a) This part contains the requirements for an industrial sludge to be classified either Class A or Class B with respect to pathogens when pathogens are expected to be present. Industrial sludge with no pathogens present or expected to be present will be classified as Class A with respect to pathogens.

(b) This part contains the site restrictions for land on which a Class B industrial sludge is applied.

(c) [Reserved]

(d) This part contains alternative vector attraction reduction requirements for industrial sludge that is applied to the land.

504.31. Special definitions.

(a) "Aerobic digestion" is the biochemical decomposition of organic matter in industrial sludge into carbon dioxide and water by microorganisms in the presence of air.

(b) "Anaerobic digestion" is the biochemical decomposition of organic matter in industrial sludge into methane gas and carbon dioxide by microorganisms in the absence of air.

(c) "Density of microorganisms" is the number of microorganisms per unit mass of total solids (dry weight) in the industrial sludge.

(d) "Land with a high potential for public exposure" is land that the public uses frequently. This includes, but is not limited to, a public contact site and a reclamation site located in a populated area (e.g., a construction site located in a city).

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

(f) "Pathogenic organisms" are disease-causing organisms. These include, but are not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

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

(h) "Specific oxygen uptake rate (SOUR)" is the mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in the industrial sludge.

(i) “Total solids” are the materials in industrial sludge that remain as residue when the industrial sludge is dried at 103 to 105 degrees Celsius.

(j) “Unstabilized solids” are organic materials in industrial sludge that have not been treated in either an aerobic or anaerobic treatment process to include extended aeration, activated sludge or other treatment processes approved by the Department.

(k) “Vector attraction” is the characteristic of industrial sludge that attracts rodents, flies, mosquitos, or other organisms capable of transporting infectious agents.

(*l*) “Volatile solids” is the amount of the total solids in industrial sludge lost when the industrial sludge is combusted at 550 degrees Celsius in the presence of excess air.

504.32. Pathogens.

(a) Industrial sludge -Class A

(1) The requirement in section 504.32(a)(2) and the requirements in either section 504.32(a)(3), section 504.32(a)(4), section 504.32(a)(5), section 504.32(a)(6), section 504.32(a)(7), or section 504.32(a)(8) shall be met for an industrial sludge to be classified Class A with respect to pathogens if pathogens are expected to be present.

(2) When pathogens are expected to be present and the industrial sludge is expected to attract vectors, the Class A pathogen requirements in section 504.32(a)(3) through section 504.32(a)(8) shall be met either prior to meeting or at the same time the vector attraction reduction requirements in section 504.33, except the vector attraction reduction requirements in section 504.33(b)(6) through section 504.33(b)(8), are met.

(3) Class A -Alternative 1 (Not available for composting).

(i) Either the density of fecal coliform in the industrial sludge 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 industrial sludge shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or give away in a bag or other container for application to the land; or at the time the industrial sludge or material derived from industrial sludge is prepared to meet the requirements in section 504.10(b), section 504.10(e), or section 504.10(f).

(ii) The temperature of the industrial sludge that is used or disposed shall be maintained at a specific value for a period of time.

(A) When the percent solids of the industrial sludge is seven percent or higher, the temperature of the industrial sludge 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 (2), except when small particles of industrial sludge are heated by either warmed gases or an immiscible liquid.

$$D = \frac{131{,}700{,}000}{10^{0.1400t}} \quad \text{(Equation 2)}$$

Where,

D = time in days.

t = temperature in degrees Celsius.

TABLE 1 OF SECTION 504.32—If the industrial sludge is 7% solids or higher.

Temperature (Celsius)	Time
50.0 (minimum)	13.17 days
60.0	12 hours 43 minutes
65.0	2 hours 39 minutes
70.0	30 minutes
71.3	20 minutes (minimum)

(B) When the percent solids of the industrial sludge is seven percent or higher and small particles of industrial sludge are heated by either warmed gases or an immiscible liquid, the temperature of the industrial sludge 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 (2).

TABLE 2 OF SECTION 504.32—If the industrial sludge is 7% solids or higher and small particles of industrial sludge are heated by warm gases or an immiscible liquid.

Temperature (Celsius)	Time
50.0 (minimum)	13.17 days
65.0	2 hours 39 minutes
71.3	20 minutes
80.0	1 minute 12 seconds
84.9	15 seconds (minimum)

(C) When the percent solids of the industrial sludge is less than seven percent and the time period is at least 15 seconds, but less than 30 minutes, the temperature and time period shall be determined using equation (2).

TABLE 3 OF SECTION 504.32—If the industrial sludge is less than 7% solids and the time period is at least 15 seconds, but less than 30 minutes.

Temperature (Celsius)	Time
70.0	30 minutes (Maximum time. See (D) for great than 30 minutes)
71.3	20 minutes
75.0	6 minutes
80.0	1 minute 12 seconds
84.9	15 seconds (minimum)

(D) When the percent solids of the industrial sludge is less than seven percent; the temperature of the industrial sludge is 50 degrees Celsius or higher; and the time period is 30 minutes or longer, the temperature and time period shall be determined using equation (3).

$$D = \frac{50{,}070{,}000}{10^{0.1400t}} \quad \text{(Equation 3)}$$

Where,

D = time in days.

t = temperature in degrees Celsius.

TABLE 4 OF SECTION 504.32—If the industrial sludge is less than 7% solids an the temperature of the industrial sludge is 50 degrees Celsius or higher; and the time period is 30 minutes or longer.

Temperature (Celsius)	Time
50.0 (minimum)	5.0 days
55.0	1.0 day
60.0	4 hours 48 minutes
65.0	58 minutes
67.0	30 minutes (minimum)

(iii) The temperature used in equation (2) and equation (3) will be the lowest, continuously measured temperature within the reaction vessel during a 24-hour period or the lowest measured temperature during any 24-hour period, if a continuous treatment process is used. If a batch treatment process is used, the temperature used in the equation (2) and equation (3) will be the lowest temperature measured during the batch treatment.

(iv) For design temperatures measuring greater than 70 degrees Celsius, continuous temperature monitoring shall be required.

(4) Class A -Alternative 2

(i) Either the density of fecal coliform in the industrial sludge 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 industrial sludge shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or give away in a bag or other container for application to the land; or at the time the industrial sludge or material derived from industrial sludge is prepared to meet the requirements in section 504.10(b), section 504.10(e), or section 504.10(f).

(ii)(A) The pH of the industrial sludge that is used or disposed shall be raised to above 12 and shall remain above 12 for 72 hours.

(B) The temperature of the industrial sludge shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the industrial sludge is above 12.

(C) At the end of the 72 hour period during which the pH of the industrial sludge is above 12, the industrial sludge shall be air dried to achieve a percent solids in the industrial sludge greater than 50 percent.

(5) Class A -Alternative 3

(i) Either the density of fecal coliform in the industrial sludge shall be less than 1000 Most Probable Number per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in industrial sludge shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or give away in a bag or other container for application to the land; or at the time the industrial sludge or material derived from industrial sludge is prepared to meet the requirements in section 504.10(b), section 504.10(e), or section 504.10(f).

(ii)(A) The industrial sludge shall be analyzed prior to pathogen treatment to determine whether the industrial sludge contains enteric viruses.

(B) When the density of enteric viruses in the industrial sludge prior to pathogen treatment is less than one Plaque-forming Unit per four grams of total solids (dry weight basis), the industrial sludge is Class A with respect to enteric viruses until the next monitoring episode for the industrial sludge.

(C) When the density of enteric viruses in the industrial sludge prior to pathogen treatment is equal to or greater than one Plaque-forming Unit per four grams of total solids (dry weight basis), the industrial sludge is Class A with respect to enteric viruses when the density of enteric viruses in the industrial sludge after pathogen treatment is less than one Plaque-forming Unit per four grams of total solids (dry weight basis) and when the values or ranges of values for the operating parameters for the pathogen treatment process that produces the industrial sludge that meets the enteric virus density requirement are documented.

(D) After the enteric virus reduction in paragraph (a)(5)(ii)(C) of this subsection is demonstrated for the pathogen treatment process, the industrial sludge continues to be Class A with respect to enteric viruses when the values for the pathogen treatment process operating parameters are consistent with the values or ranges of values documented in paragraph (a)(5)(ii)(C) of this subsection.

(iii)(A) The industrial sludge shall be analyzed prior to pathogen treatment to determine whether the industrial sludge contains viable helminth ova.

(B) When the density of viable helminth ova in the industrial sludge prior to pathogen treatment is less than one per four grams of total solids (dry weight basis), the industrial sludge is Class A with respect to viable helminth ova until the next monitoring episode for the industrial sludge.

(C) When the density of viable helminth ova in the industrial sludge prior to pathogen treatment is equal to or greater than one per four grams of total solids (dry weight basis), the industrial sludge is Class A with respect to viable helminth ova when the density of viable helminth ova in the industrial sludge after pathogen treatment is less than one per four grams of total solids (dry weight basis) and when the values or ranges of values for the operating parameters for the pathogen treatment process that produces the industrial sludge that meets the viable helminth ova density requirement are documented.

(D) After the viable helminth ova reduction in paragraph (a)(5)(iii)(C) of this subsection is demonstrated for the pathogen treatment process, the industrial sludge continues to be Class A with respect to viable helminth ova when the values for the pathogen treatment process operating parameters are consistent with the values or ranges of values documented in paragraph (a)(5)(iii)(C) of this subsection.

(6) Class A -Alternative 4

(i) Either the density of fecal coliform in the industrial sludge 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 industrial sludge shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or give away in a bag or other container for application to the land; or at the time the industrial sludge or material derived from industrial sludge is prepared to meet the requirements in section 504.10(b), section 504.10(e), or section 504.10(f).

(ii) The density of enteric viruses in the industrial sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or give away in a bag or other container for application to the land; or at the time the industrial sludge or material derived from industrial sludge is prepared to meet the requirements in section 504.10(b), section 504.10(e), or section 504.10(f), unless otherwise specified by the Department.

(iii) The density of viable helminth ova in the industrial sludge shall be less than one per four grams of total solids (dry weight basis) at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or give away in a bag or other container for application to the land; or at the time the industrial sludge or material derived from industrial sludge is prepared to meet the requirements in section 504.10(b), section 504.10(e), or section 504.10(f), unless otherwise specified by the Department.

(7) Class A -Alternative 5

(i) Either the density of fecal coliform in the industrial sludge 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 industrial sludge shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or give away in a bag or other container for application to the land; or at the time the industrial sludge or material derived from industrial sludge is prepared to meet the requirements in section 504.10(b), section 504.10(e), or section 504.10(f).

(ii) Industrial sludge that is used or disposed shall be treated in one of the Processes to Further Reduce Pathogens described in appendix B of this part if pathogens are expected to be present.

(8) Class A -Alternative 6

(i) Either the density of fecal coliform in the industrial sludge 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 industrial sludge shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or give away in a bag or other container for application to the land; or at the time the industrial sludge or material derived from industrial sludge is prepared to meet the requirements in section 504.10(b), section 504.10(e), or section 504.10(f).

(ii) Industrial sludge that is used or disposed shall be treated in a process that is equivalent to a Process to Further Reduce Pathogens, as determined by the Department.

(b) Industrial sludge -Class B

(1)(i) The requirements in either section 504.32(b)(2), section 504.32(b)(3), or section 504.32(b)(4) shall be met for an industrial sludge to be classified Class B with respect to pathogens if pathogens are expected to be present.

(ii) The site restrictions in section 504.32(b)(5) shall be met when industrial sludge that meets the Class B pathogen requirements in section 504.32(b)(2), section 504.32(b)(3), or section 504.32(b)(4) is applied to the land.

(2) Class B -Alternative 1

(i) Seven representative samples of the industrial sludge shall be collected at the time the industrial sludge is used or disposed.

(ii) The geometric mean of the density of fecal coliform in the samples collected in (b)(2)(i) of this subsection 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).

(3) Class B -Alternative 2. Industrial sludge that is used or disposed shall be treated in one of the Processes to Significantly Reduce Pathogens described in appendix B of this part.

(4) Class B -Alternative 3. Industrial sludge that is used or disposed shall be treated in a process that is equivalent to a Process to Significantly Reduce Pathogens, as determined by the Department.

(5) Site Restrictions

(i) Food crops with harvested parts that touch the industrial sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of industrial sludge.

(ii) Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of industrial sludge when the industrial sludge remains on the land surface for four months or longer prior to incorporation into the soil.

(iii) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of industrial sludge when the industrial sludge remains on the land surface for less than four months prior to incorporation into the soil.

(iv) Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of industrial sludge.

(v) Animals shall not be grazed on the land for 30 days after application of industrial sludge.

(vi) Turf grown on land where industrial sludge is applied shall not be harvested for one year after application of the industrial sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the Department.

(vii) Public access to land with a high potential for public exposure shall be restricted for one year after application of industrial sludge.

(viii) Public access to land with a low potential for public exposure shall be restricted for 30 days after application of industrial sludge.

(ix) The Department may establish in permits the required application buffer setbacks for property boundaries, roadways, residential developments, dwellings, water wells, drainageways, and surface water as deemed necessary to protect public health.

(x) The Department may establish minimum requirements in permits for soil and/or groundwater monitoring, for bulk application sites, to verify compliance with the Regulation.

(c) [Reserved]

(1) [Reserved]

(2) [Reserved]

(3) [Reserved]

504.33. Vector attraction reduction.

(a)(1) One of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8); a requirement that is equivalent to one of the vector attraction reduction requirements in section 504.33(b)(1) through (b)(8), as determined by the Department; or the vector attraction reduction requirements in section 504.33(b)(9) or (b)(10) shall be met when bulk industrial sludge is applied to agricultural land, forest, a public contact site, or a reclamation site when the industrial sludge is expected to attract vectors.

(2) One of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8); or an equivalent requirement, as determined by the Department, shall be met when bulk industrial sludge is applied to a lawn or a home garden when the industrial sludge is expected to attract vectors.

(3) One of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(8); or an equivalent requirement, as determined by the Department, shall be met when industrial sludge is sold or given away in a bag or other container for application to the land when the industrial sludge is expected to attract vectors.

(4) [Reserved]

(5) One of the vector attraction reduction requirements in section 504.33(b)(9), section 504.33(b)(10), or section 504.33(b)(12) shall be met when industrial septage is applied to agricultural land, forest, or a reclamation site when the industrial septage is expected to attract vectors.

(6) One of the vector attraction reduction requirements in section 504.33(b)(1) through section 504.33(b)(10) or section 504.33(b)(13) shall be met when industrial sludge is bulk applied to agricultural land, forest, a public contact site, or a reclamation site when the industrial sludge is expected to attract vectors.

(b)(1) The mass of volatile solids in the industrial sludge shall be reduced by a minimum of 38 percent (see calculation procedure in “Environmental Regulations and Technology-Control of Pathogens and Vector Attraction in Sewage Sludge”, EPA-625/R-92/013, 1992, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268).

(2) When the 38 percent volatile solids reduction requirement in section 504.33(b)(1) cannot be met for an anaerobically digested industrial sludge, vector attraction reduction can be demonstrated by digesting a portion of the previously digested industrial sludge 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 industrial sludge at the beginning of that period is reduced by less than 17 percent, vector attraction reduction is achieved.

(3) When the 38 percent volatile solids reduction requirement in section 504.33(b)(1) cannot be met for an aerobically digested industrial sludge, vector attraction reduction can be demonstrated by digesting a portion of the previously digested industrial sludge that has a percent solids of two percent 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 industrial sludge at the beginning of that period is reduced by less than 15 percent, vector attraction reduction is achieved.

(4) The specific oxygen uptake rate (SOUR) for industrial sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius. Other values may be allowed by the Department on a case-by-case basis.

(5) Industrial sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the industrial sludge shall be higher than 40 degrees Celsius and the average temperature of the industrial sludge shall be higher than 45 degrees Celsius. Other processes may be allowed by the Department on a case-by-case basis.

(6) The pH of industrial sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or given away in a bag or other container for application to the land; or at the time the industrial sludge is prepared to meet the requirements in section 504.10(b), (c), (e), or (f).

(7) The percent solids of industrial sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials, at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or given away in a bag or other container for application to the land; or at the time the industrial sludge is prepared to meet the requirements in section 504.10(b), (c), (e), or (f).

(8) The percent solids of industrial sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials, at the time the industrial sludge is used or disposed; at the time the industrial sludge is prepared for sale or given away in a bag or other container for application to the land; or at the time the industrial sludge is prepared to meet the requirements in section 504.10(b), (c), (e), or (f).

(9)(i) Industrial sludge shall be injected below the surface of the land.

(ii) No significant amount of the industrial sludge shall be present on the land surface within one hour after the industrial sludge is injected.

(iii) When the industrial sludge that is injected below the surface of the land is Class A with respect to pathogens, the industrial sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

(10)(i) Industrial sludge applied to the land surface shall be incorporated into the soil within six hours after application to or placement on the land, unless otherwise specified by the Department.

(ii) When industrial sludge that is incorporated into the soil is Class A with respect to pathogens, the industrial sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

(11) [Reserved]

(12) The pH of industrial septage shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for 30 minutes.

(13) The vector attraction reduction requirement may be met through an alternative method to be determined by the Department on a case-by-case basis.

504.50. Odor Control Requirements.

The permit holder shall use best management practices normally associated with the proper operation and maintenance of a sludge wastewater treatment site, any sludge storage or lagoon areas, transportation of sludges, and all individual activities permitted under R.61-9.504 to ensure that an undesirable level of odor does not exist.

(a) The permittee shall prepare an odor abatement plan for the industrial sludge treatment sites, any sludge storage or lagoon areas, and land application or surface disposal sites. Permittees that land-apply sludge must prepare the plan within 180 days of the effective date of this regulation (effective date of June 26, 2003). Permittees that have facilities described above that require plans have one (1) year from the June 26, 2003 effective date to prepare the plan. Odor abatement plans must be submitted for new projects with the submission of permit applications. The plan must include the following topics:

(1) Operation and maintenance practices which are used to eliminate or minimize undesirable odor levels in the form of best management practices for Odor Control;

(2) Use of treatment processes for the reduction of undesirable odors;

(3) Use of setbacks; and

(4) Contingency plans and methods to address odor problems for the different type of disposal/application methods used.

(b) Unless otherwise requested, prior to issuance of a new or expanded land application disposal permit (either NPDES or Land Application), the Department may review the odor abatement plan for compliance with this Part (504.50). The Department may require changes to the plan as appropriate.

(c) No permittee may cause, allow, or permit emission into the ambient air of any substance or combinations of substances in quantities that an undesirable level of odor is determined to result unless preventative measures of the type set out below are taken to abate or control the emission to the satisfaction of the Department. When an odor problem comes to the attention of the Department through field surveillance or specific complaints, the Department may determine, in accordance with section 48-1-120 of the Pollution Control Act, if the odor is at an undesirable level by considering the character and degree of injury or interference to:

(1) The health or welfare of the people;

(2) Plant, animal, freshwater aquatic, or marine life;

(3) Property; or

(4) Enjoyment of life or use of affected property.

(d) After determining that an undesirable level of odor exists, the Department may require:

(1) the permittee to submit a corrective action plan to address the odor problem,

(2) remediation of the undesirable level of odor within a reasonable timeframe, and

(3) in an order, specific methods to address the problem.

(e) If the permittee fails to control or abate the odor problems addressed in this section within the specified timeframe, the Department may revoke disposal/application activities associated with the site or the specific aspect of the sludge management program.

APPENDIX A. PROCEDURE TO DETERMINE THE ANNUAL WHOLE SLUDGE APPLICATION RATE FOR AN INDUSTRIAL SLUDGE

Section 504.13(a)(4)(ii) requires that the product of the concentration for each pollutant listed in Table 4 of section 504.13 in industrial sludge sold or given away in a bag or other container for application to the land and the annual whole sludge application rate (AWSAR) for the industrial sludge not cause the annual pollutant loading rate for the pollutant in Table 4 of section 504.13 to be exceeded. This appendix contains the procedure used to determine the AWSAR for an industrial sludge that does not cause the annual pollutant loading rates in Table 4 of section 504.13 to be exceeded.

The relationship between the annual pollutant loading rate (APLR) for a pollutant and the annual whole sludge application rate (AWSAR) for an industrial sludge is shown in equation (1).

$$APLR = C \times AWSAR \times 0.001 \qquad (1)$$

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).

AWSAR = Annual whole sludge application rate in metric tons per hectare per 365 day period (dry weight basis).

0.001 = A conversion factor.

To determine the AWSAR, equation (1) is rearranged into equation (2):

$$AWSAR = \frac{APLR}{C \times 0.001} \qquad (2)$$

The procedure used to determine the AWSAR for an industrial sludge is presented below.

PROCEDURE:

1. Analyze a sample of the industrial sludge to determine the concentration for each of the pollutants listed in Table 4 of section 504.13 in the industrial sludge.

2. Using the pollutant concentrations from Step 1 and the APLRs from Table 4 of section 504.13, calculate an AWSAR for each pollutant using equation (2) above.

3. The AWSAR for the industrial sludge is the lowest AWSAR calculated in Step 2.

APPENDIX B. PATHOGEN TREATMENT PROCESSES

A. PROCESSES TO SIGNIFICANTLY REDUCE PATHOGENS (PSRP)

1. Aerobic digestion. Industrial sludge is 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.

2. Air drying. Industrial sludge is dried on sand beds or on paved or unpaved basins. The industrial sludge dries for a minimum of three months. During two of the three months, the ambient average daily temperature is above zero degrees Celsius.

3. Anaerobic digestion. Industrial sludge is 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.

4. Composting. Using either the within-vessel, static aerated pile, or windrow composting methods, the temperature of the industrial sludge is raised to 40 degrees Celsius or higher and remains at 40 degrees Celsius or higher for five days. For four hours during the five days, the temperature in the compost pile exceeds 55 degrees Celsius.

5. Lime stabilization. Sufficient lime is added to the industrial sludge to raise the pH of the industrial sludge to 12 after two hours of contact.

6. Industrial sludge. Industrial sludge may meet the PSRP requirement through an alternate procedure to be determined by the Department on a case-by-case basis.

B. PROCESSES TO FURTHER REDUCE PATHOGENS (PFRP)

1. Composting. Using either the within-vessel composting method or the static aerated pile composting method, the temperature of the industrial sludge is maintained at 55 degrees Celsius or higher for three days.

Using the windrow composting method, the temperature of the industrial sludge 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 five turnings of the windrow.

2. Heat drying. Industrial sludge is dried by direct or indirect contact with hot gases to reduce the moisture content of the industrial sludge to 10 percent or lower. Either the temperature of the industrial sludge particles exceeds 80 degrees Celsius or the wet bulb temperature of the gas in contact with the industrial sludge as the industrial sludge leaves the dryer exceeds 80 degrees Celsius.

3. Heat treatment. Liquid industrial sludge is heated to a temperature of 180 degrees Celsius or higher for 30 minutes.

4. Thermophilic aerobic digestion. Liquid industrial sludge is agitated with air or oxygen to maintain aerobic conditions and the mean cell residence time of the industrial sludge is 10 days at 55 to 60 degrees Celsius.

5. Beta ray irradiation. Industrial sludge is irradiated with beta rays from an accelerator at dosages of at least 1.0 megarad at room temperature (ca. 20 degrees Celsius).

6. Gamma ray irradiation. Industrial sludge is irradiated with gamma rays from certain isotopes, such as Cobalt 60 and Cesium 137, at room temperature (ca. 20 degrees Celsius).

7. Pasteurization. The temperature of the industrial sludge is maintained at 70 degrees Celsius or higher for 30 minutes or longer.

8. Industrial sludge. Industrial sludges may meet the PFRP requirement through an alternate procedure to be determined by the Department on a case-by-case basis.

APPENDIX C. PCB. POLYCHLORINATED BIPHENYLS

(1) Beginning with the effective date of this appendix, sludges for land application (including sewage sludge, sludges and septage that may be mixed with grease trap waste) must be sampled at least quarterly (based on calendar year quarters) for PCBs using EPA SW-846 Method 8082A with an appropriate sample preparation method approved for use by the Department based on the matrix of the sample. This includes but is not limited to: bulk sewage sludge applied to agricultural land, forests or public contact sites; sewage sludge sold or given away in a bag or other container for application to the land; domestic septage; reclamation sites; or other materials mixed with sludge before application. Reporting the above information, in addition to requirements specified later in this appendix, should be included in annual reports required by permits.

(2) If levels of PCBs are greater than or equal to one (1) milligram per kilogram (mg/kg dry weight basis), but less than ten (10) milligrams per kilogram (mg/kg dry weight basis), confirmation sludge sampling must be done as soon as practicable and the results provided to the Department within five (5) calendar days of receipt by the permittee.

(3) If levels of PCBs are greater than or equal to ten (10) milligrams per kilogram (mg/kg dry weight basis), confirmation sludge sampling must be done as soon as practicable and the results provided to the Department within five (5) calendar days of receipt of the results by the permittee. In addition, representative soil sampling of land application sites that may have received sludge during the monitoring period must be conducted within 30 days of knowledge of the confirmation sampling that confirms sludge PCB levels equal to or greater than ten (10) milligrams per kilogram (mg/kg dry weight basis). The results of the soil sampling must be provided to the Department within five (5) calendar days of receipt by the permittee. The Department may require any further action as deemed necessary and consistent with applicable laws.