

BENEFICIAL USE OF INDUSTRIAL BYPRODUCTS

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NR 538.01 Purpose. The purpose of this chapter is to **facilitate**, ~~allow and encourage~~ to the maximum extent possible, ~~consistent with the protection of public health and the environment and good engineering practices~~, the **diversion and** beneficial use of industrial byproducts in a nuisance-free manner **that is protective of public health and the environment and in accordance with good engineering practices**. The department encourages the beneficial use of industrial byproducts ~~in order~~ to preserve resources, conserve energy, and reduce or eliminate the need to dispose of industrial byproducts in landfills. This chapter is adopted under ss. 289.05, 289.06, 289.43 (4), (7) and (8), and 227.11, Stats.

NR 538.02 Applicability.

(1) Except as otherwise provided, this chapter governs the beneficial use of industrial byproducts, except hazardous waste as defined in s. 291.01 (7), Stats., and regulated under chs. NR 660 to 679; metallic mining operations for nonferrous minerals as defined in s. 293.01 (9), Stats., and regulated under ch. NR 182; and metallic mining operations for ferrous minerals as defined in s. 295.41 (26), Stats., including mining wastes and mining waste sites as defined in s. 295.41 (30) and (31), Stats., and regulated under subch. III of ch. 295, Stats.

(2) This chapter does not apply to the design, construction or operation of industrial wastewater facilities, sewerage systems and waterworks treating liquid wastes approved under s. 281.41, Stats., or permitted under ch. 283, Stats., nor to facilities used solely for the disposal of liquid municipal or industrial wastes which have been approved under s. 281.41, Stats., or permitted under ch. 283, Stats., except facilities used for the disposal of solid waste.

Note: The landspreading of wastewater treatment sludges is regulated under chs. NR 206 and 214. The landspreading of solid wastes is regulated under ch. NR 518. ~~Other~~ **Additional** state and local laws and codes, ~~however~~, may apply to the beneficial use of industrial byproducts regulated under this chapter.

NR 538.03 Definitions. The following definitions as well as the definitions in ch. 289, Stats., and s. NR 500.03 are applicable to the terms used in this chapter unless the context requires otherwise.

(1) "~~Base course~~ **aggregates**" means ~~the layer or layers of~~ specified or selected material of designated thickness placed on a ~~subbase or~~ subgrade to support a pavement or other structure.

(2) **"Beneficial use" or "beneficial reuse" means the utilization of an industrial byproduct in a productive manner.**

(2) ~~"Confined geotechnical fill" means a fill that is covered by an impervious surface.~~

(3) "Flue gas desulfurization" means the material recovered from air pollution control systems that capture sulfur dioxide emissions from energy recovery facilities. **This definition includes flue gas desulfurization gypsum produced as a byproduct of a lime or limestone-based reagent wet air pollution control scrubbing process that includes a forced oxidation system resulting in commercial grade calcium sulfate. It also includes flue gas desulfurization byproduct material generated in a dry or semi-dry spray dryer absorber air quality control system provided the system includes separate coal combustion fly ash capture by means of an electrostatic precipitator or baghouse filter.**

(4) "Foundry sand" means spent silica-based molding and core sand used in the metal casting process. This includes foundry dry baghouse and wet collector sand fines collected during the metal casting process.

(5) "Impervious surface" means a barrier layer designed to prevent percolation or contain liquids that have come into contact with the byproduct consisting of a minimum 3 inches thick of asphalt or concrete, a minimum 2 foot thick clay layer constructed in accordance with s. NR 504.06(2)(a) and s. NR 504.06(2)(f), a geomembrane layer constructed in accordance with s. NR 504.07(5), or other impervious surface designs approved in writing by the department.

(46) "Industrial byproduct" means papermill sludge, ~~combustion ash from energy recovery~~ including coal ~~combustion residuals such as fly ash, bottom ash, boiler slag, and ash and slag,~~ material captured in flue gas desulfurization systems, ferrous, steel and aluminum foundry ~~excess system sand,~~ and aluminum slag, lime kiln dust, or non-hazardous solid waste with similar characteristics as determined by the department. ~~To be considered under this definition, materials must have been generated as a byproduct of an industrial process and possess consistent physical and chemical properties. This definition does not include the following:~~

- (a) post-consumer waste or the byproducts of combusting or processing post-consumer waste,
- (b) ash from solid waste incinerators,
- (c) slag generated by the production or processing of iron or steel that is managed as an item of value in a controlled manner and not discarded per s. 289.01(33), Stats., or
- (d) previously discarded material.

(57) "Lime kiln dust" means the material recovered ~~for~~ from air pollution control systems that capture emissions from lime kilns.

(8) "Productive manner", as defined in this chapter, means the use of an industrial byproduct that meets all of the following criteria:

- (a) provides a functional benefit,
- (b) substitutes for the use of a virgin material that must be otherwise obtained, and
- (c) meets relevant product specifications, regulatory or design standards when available, and not used in excess quantities.

(9) "Representative sample" means any sample of byproduct material collected for analysis which reliably exhibits the average properties of the byproduct production stream.

(610) "Residential area" means properties that are zoned as residential, are in areas planned for residential zoning under a master plan approved or adopted by a local municipal authority or an area within 100 feet of a human residence.

(11) "Soil or plant additive" means a substance, intended for application to seeds, soil, or plants, that is designed for use or claimed to have value in promoting or sustaining plant

growth, improving crop yield or quality, promoting or sustaining the fertility of the soil, or favorably modifying the structural, physical, or biological properties of the soil for agronomic or horticultural purposes in accordance with s. ATCP 40, Subchapter III or s. ATCP 41.

~~(7) "Subbase" means the layer or layers of specified or selected material placed on a subgrade to support a base course.~~

(8~~12~~) "Subgrade" means the top soil surface upon which a subbase or base aggregates course are placed.

(9~~13~~) "Subgrade fill" means the layer or layers of material placed above the natural ground surface to achieve a subgrade.

~~(10) "Unconfined geotechnical fill" means a fill that is covered by native soils.~~

NR 538.04 Performance standards. No person may store, handle or beneficially use an industrial byproduct in a manner that may cause any of the following:

(1) A significant adverse impact on wetlands per ch. NR 103.

(2) A take of an endangered or threatened species or other activity prohibited under s. 29.604, Stats.

(3) A detrimental effect on any surface water.

(4) A detrimental effect on groundwater quality or will cause or exacerbate an attainment or exceedance of any preventive action limit or enforcement standard at a point of standards application as defined in ch. NR 140.

(5) The migration and concentration of explosive gases in any structures, or in the soils or air at or beyond the project property boundary in excess of 25% of the lower explosive limit for the gases at any time.

(6) The emissions of any hazardous air contaminant exceeding the limitations for those substances contained in s. NR 445.034 or 445.05.

(7) A discharge of pollutants carried by storm water exceeding any applicable permit requirements or standards under ch. NR 216.

(8) Nuisance conditions or environmental pollution as defined under s. 289.01(8), Stats. resulting from windblown dust, odor, tracking or spillage of the industrial byproduct.

Note: The placement of materials in a floodplain where which results in an obstruction to flood flows or an increase in regional flood event or an adverse effect upon a drainage course is regulated under ch. NR 116.

Note: The emissions of particulates and volatile organic compounds are regulated under s. NR 415.03 and chs. NR 419 to 424.

NR 538.05 Solid waste rules exemption.

(1) General. Persons who generate, use, transport or store industrial byproducts that are characterized and beneficially used in compliance with this chapter are exempt from licensing under s. 289.31, Stats., and the regulatory requirements in chs. NR 500 to 538.6.

(2) Existing exemptions. This chapter does not abrogate, rescind or terminate an approval or grant of exemption in effect on January 1, 1998 that was issued under s. 289.43 (7) or (8), Stats. Nothing in this subsection limits the authority of the department to modify, terminate or rescind any approval or grant of exemption as provided by law.

NR 538.06 Industrial byproduct characterization.

(1) General. Industrial byproducts that are beneficially used under this chapter shall be characterized as specified in this section to determine their appropriate categorization **eligible uses** under s. NR 538.0810. The results of this characterization shall be reported to the department as specified in s. NR 538.14. **Written notification in accordance with s. NR 538.14 (1) is required prior to use. The department shall reply with a written concurrence within 10 business days provided the applicant meets the applicable criteria of this chapter. Once the department has determined that the notification is complete, the department has the option of concurring with the characterization, requesting additional information or analysis, or determining that a case-specific approval under s. 538.09 is required. If the department does not respond to a complete notification within 10 business days, concurrence is considered granted.**

The testing program for materials not specifically listed in tables 1A to 23 shall be approved by the department **in writing** prior to characterization. For those materials not listed in tables 1A to 23 the department may modify the list of parameters required to be analyzed for and may establish standards on a material specific basis for additional parameters.

Note: Byproduct generators that have submitted an initial certification prior to the effective date of the revised rule are not required to re-submit an initial certification notification for department concurrence.

(2) Initial characterization. A representative sample of **each an** industrial byproduct shall be properly characterized prior to beneficial use to determine its **category eligible uses** under s. NR 538.0810. **Samples shall be obtained at the point of accumulation nearest to where the byproduct is generated. A case specific approval under s. NR 538.09 may be required if the byproduct is subject to any deliberate post-accumulation conditioning or processing.**

(3) Characterization methods.

(a) The limits of detection used in the characterization shall be at or below the concentrations listed in the Appendix I tables 1A to 23 for each parameter for the specific target category where possible. When a limit of detection at or below a target category standard is not achievable, or if no concentration is listed, the method that will achieve the lowest detection limit shall be used. All material sampling, total elemental analyses and analyses of elutriate from leach testing shall be performed using EPA SW-846 methods, unless otherwise approved by the department in writing. The limit of detection and the limit of quantitation shall be reported with the sample results. If a substance is detected below the limit of quantitation, the detected value with the appropriate qualifier shall be reported.

(b) All industrial byproducts that are to be beneficially used under this chapter shall first be determined not to be a hazardous waste as defined under s. NR 660.10 (52) using a method specified under ch. NR 661-662.011. The generator shall provide supporting documentation of the waste determination along with the initial certification submitted to the department per s. NR 538.06(1).

Note: Supporting documentation may include, but is not limited to, representative sampling and analysis, Safety Data Sheets, published information, process flow diagrams, profiles developed from the prior handling of industrial byproducts, or supported process knowledge.

(c) All industrial byproducts which are characterized to determine eligibility for category 1 to 4 under s. NR 538.08 (1) to (4) except byproducts to be used as a soil or plant additive in accordance with s. NR 538.10(5), shall be analyzed using ASTM D3987-12-85 water leach test as specified by material in Appendix I, Table 1A.

(d) All industrial byproducts, which are characterized to determine eligibility for category 1 or 2 under s. NR 538.08 (1) or (2) except byproducts to be used as a soil or plant additive in accordance with s. NR 538.10(5), shall be analyzed using a total elemental bulk analysis for the parameters in Appendix I, Table 1B, unless another analysis-analytical method is approved by the department in writing.

(e) All flue gas desulfurization byproducts to be marketed and used as soil or plant additives in accordance with s. NR 538.10(5) shall be analyzed using a total elemental analysis for the parameters in Appendix I, Table 2, unless another analytical method or parameters are approved by the department in writing.

(4) Mixing. If separate industrial byproducts will be mixed together, each of the byproducts must be individually eligible for the specific intended final use of the resulting mixture unless otherwise approved by the department in writing under s. NR 538.09.

Note: Copies of EPA SW-846 test methods are available at no cost at www.epa.gov/epaoswer/hazwaste/test/main.htm. Copies of the test methods are available for inspection at the offices of the Department of Natural Resources, the Secretary of State and the Legislative Reference Bureau. Copies may be obtained from the superintendent of documents, U.S. government printing office, P.O. Box 371954, Pittsburgh, PA 15250-7954, (866) 512-1800, www.gpo.gov. Copies may also be obtained from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161, (800) 553-6847, www.ntis.gov.

Note: ASTM-D3987-85 12 is the American society for testing and materials "Test Method for Shake Extraction of Solid Wastes with Water." Copies of the ASTM standard may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, 1-877-909-2786 (610) 832-9585, www.astm.org. Copies of the standard are available for inspection at the offices of the Department of Natural Resources, the Secretary of State and the Legislative Reference Bureau.

Note: Due to the presence of combined water, samples of FGD gypsum should be tested in accordance with ASTM C 471M, "Standard Test Methods for Chemical Analysis of Gypsum and Gypsum Products".

(4) Recharacterization. Industrial byproducts that are beneficially used under this chapter shall be recharacterized after the initial characterization in accordance with this section, unless the department approves, in writing, an alternative recharacterization method. Industrial byproducts shall be recharacterized following either a:

(a) ~~Industrial byproducts that are beneficially used under this chapter shall be recharacterized after the initial characterization in accordance with this section, unless the department approves an alternative recharacterization method.~~ **Process change.** A representative sample of each industrial byproduct shall be recharacterized whenever there is a change in the process that produces the industrial byproduct that could **potentially** result in a change of the category in the eligible uses of the industrial byproduct, or

(b) ~~A representative sample of each category 1 industrial byproduct shall be recharacterized in the same manner as specified for the initial characterization once each year. Recharacterization is not required for any category 1 industrial byproduct of which less than 1000 cubic yards were beneficially used or stored for beneficial use in the previous year.~~

(c) ~~A representative sample of each category 2 industrial byproduct shall be recharacterized in the same manner as specified for the initial characterization once every 2 years. Recharacterization is not required for any category 2 industrial byproduct of which less than 2000 cubic yards were beneficially used or stored for beneficial use during the previous 2 year period.~~

~~(db)~~ **Three-year period.** A representative sample of each ~~category 3~~ industrial byproduct shall be recharacterized ~~in the same manner~~ **accordance with Appendix I, Tables 1A and 1B** as specified for the initial characterization once every 3 years **from the date of the initial certification or the last recharacterization**. Recharacterization is not required for any ~~category 3~~ industrial byproduct of which less than 3000 cubic yards were beneficially used or stored for beneficial use during the previous 3-year period.

~~(e)~~ A representative sample of each ~~category 4~~ industrial byproduct shall be recharacterized ~~in the same manner as specified for the initial characterization once every 5 years~~. Recharacterization is not required for any ~~category 4~~ industrial byproduct of which less than 5000 cubic yards were beneficially used or stored for beneficial use in the previous 5-year period.

Note: Byproduct generators that have submitted an initial certification prior to the effective date of the rule revision can submit a recharacterization to the department within 3 years of the date of the last recharacterization or initial certification submitted to the department prior to the effective date of the revised rule, provided there has been no process change.

NR 538.08 ~~Industrial byproduct categories.~~ The categories of industrial byproducts, characterized in accordance with s. NR 538.06, for beneficial use under this chapter are as follows: **Determination of eligible uses.** Acceptable beneficial uses for industrial byproducts that have been determined not to be a hazardous waste as defined in s. NR 660.10 (52) and tested in accordance with s. NR 538.06 shall be determined as follows:

(1) ~~Category 1 industrial byproducts.~~ Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in ch. NR 538 Appendix I, Tables 1A and 1B, are ~~category 1 industrial byproducts~~. **Contained or converted uses.** All industrial byproducts are eligible for contained or converted uses in accordance with the provisions of s. NR 538.10(1) and this chapter.

(2) ~~Category 2 industrial byproducts.~~ Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in ch. NR 538 Appendix I, Tables 2A and 2B, and are not ~~category 1 industrial byproducts~~ are ~~category 2 industrial byproducts~~. If in the total elemental analysis total polycyclic aromatic hydrocarbons exceed 100 mg/kg, department concurrence is necessary prior to classification as a ~~category 2 industrial byproduct~~. Unless authorized by the department the total elemental analysis for industrial byproducts not listed in Table 2B shall also include aluminum, antimony, barium, boron, cadmium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, phenol, selenium, silver, strontium, thallium, vanadium and zinc. **Geotechnical fill.** Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in ch. NR 538 Appendix I, Table 1A are eligible for use as geotechnical fill in accordance with the provisions of NR 538.10(2) and this chapter.

(3) ~~Category 3 industrial byproducts. Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in ch. NR 538 Appendix I, Table 2A, and are not category 1 or 2 industrial byproducts are category 3 industrial byproducts. Coal ashes are category 3 industrial byproducts if the concentration of boron is less than 3.4 mg/l and the concentration of all other parameters are less than those concentrations listed in ch. NR 538 Appendix I, Table 2A.~~ **Construction uses. All industrial byproducts are eligible for construction uses in accordance with the provisions of s. NR 538.10(3) and this chapter.**

(4) ~~Category 4 industrial byproducts. Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in ch. NR 538 Appendix I, Table 3, and are not category 1 to 3 industrial byproducts are category 4 industrial byproducts.~~ **Unconfined uses. Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in ch. NR 538 Appendix I, Tables 1A and 1B are eligible for unconfined uses in accordance with the provisions of NR 538.10(4) and this chapter.**

(5) ~~Category 5 industrial byproducts. Industrial byproducts that have been determined not to be a hazardous waste as defined in s. NR 660.10 (52) and are not category 1 to 4 industrial byproducts are category 5 industrial byproducts.~~ **Soil or plant additive. Flue gas desulfurization byproducts that have been determined to contain less than the concentration specified for the parameters listed in ch. NR 538 Appendix I, Table 2, are eligible for use as soil and plant additives in accordance with the provisions of s. NR 538.10(5) and this chapter. Industrial byproducts intended for use as agricultural liming additives that have been determined to contain less than the concentrations specified in Table 3 of s. NR 204.07(5)(c) are eligible for use as soil or plant additives in accordance with the provisions of s. NR 538.10(5).**

(6) Criteria and process for using ~~category~~ **eligibility** standards.

(a) If a standard for a parameter listed in ch. NR 538 Appendix I is above the limit of detection and the limit of quantitation, the standard shall be considered ~~to be~~ exceeded if the parameter is reported at or above the standard.

(b) If a standard for a parameter listed in ch. NR 538 Appendix I is between the limit of detection and the limit of quantitation, inclusive, the standard shall be considered ~~to be~~ exceeded if the parameter is reported at or above the limit of quantitation.

(c) The following applies when a standard for a parameter listed in ch. NR 538 Appendix I is below the lowest achievable limit of detection:

1. If a parameter is not detected in a sample, the standard will be considered to have been met.

2. If a parameter is reported at or above the limit of detection but below the limit of quantitation, a confirmation analysis shall be conducted. The standard shall be considered

~~to be~~ exceeded if the presence of that parameter has been confirmed by the use of an appropriate analytical method.

3. If a parameter is reported at or above the limit of quantitation, the standard shall be considered ~~to be~~ exceeded.

Note: The department may revise this rule to add or remove parameters or revise standards if changes in ch. NR 140, or other information warrant modifications.

~~(7)~~ **NR 538.09** Case specific **approvals**. The department may review the characterization results for an industrial byproduct in response to a request from the generator of the industrial byproduct not defined in s. NR 538.03 ~~(46)~~ and ~~assign~~ **approve** a ~~category or categories~~ **beneficial use or uses** for that material, or conditionally approve a beneficial use that does not meet the beneficial uses or standards specified in this chapter, on a case specific basis. The department may require additional information prior to a case specific approval. Any exemption or approval granted under this subsection shall be in accordance with the applicable requirements of s. 289.43 (4), (7) and (8), Stats.

NR 538.10 ~~Eligible B~~ **beneficial uses**. **All uses shall meet all applicable structural and physical specifications and generally accepted engineering practices for the use. Under this chapter, ~~the eligible~~ beneficial uses of industrial byproducts under this chapter which may be exempt from licensing under s. 289.31, Stats., and the regulatory requirements under chs. NR 500 to 538 regulation as provided under s. NR 538.12 are:**

(1) **Contained or converted uses. This category includes uses that are fully contained within a licensed, engineered disposal facility, encapsulated within a matrix material, burned for fuel or converted into a product.**

~~(a) Raw materials for manufacturing of a product~~ **Encapsulated uses are those** in which the measurable leaching, emissions or decomposition characteristics of the industrial byproduct are substantially eliminated **by binding them into a solid matrix**. Products that would meet these criteria include cement, lightweight aggregate, structural or ornamental concrete or ceramic materials, portland cement concrete pavement, asphaltic concrete pavement, **slurry seals**, roofing materials, plastics, paint, fiberglass, mineral wool, wallboard, plaster and other products as approved **in writing** by the department.

~~(2b)~~ **Agents for physical or chemical stabilization, solidification or other treatment of solid waste that is to be disposed of at a lined landfill having a leachate collection system, or utilized in some other final use approved in writing by the department.**

~~(3c)~~ **Supplemental material used for fuels or to assist air pollution control during the process of combustion for that provide energy production through controlled burning.**

~~(4d)~~ **Daily cover or internal structures at lined landfills having a leachate collection system. The industrial byproducts used for this purpose may not contain free liquids. The**

industrial byproducts used as landfill daily cover may contain not more than 15% of silt and clay sized materials (P200 content), and may not be placed in layers greater than 6 inches thick. In addition, ~~any the~~ industrial byproducts used as landfill daily cover shall be able to control disease vectors, fires, odors, blowing litter and scavenging without presenting a threat to human health or the environment. **Any uses under this section shall be subject to the conditions of the plan of operation and any other applicable solid waste approvals associated with the landfill.**

~~NR 538.10(5) (5) Confined~~ **g(2) Geotechnical** fill material in accordance with **meeting** the project criteria and uses specified in this subsection **and NR 538.12 where applicable. Unless otherwise noted in (b) and (f),** if more than 5,000 cubic yards are to be used in an individual project, prior written notification in accordance with s. NR 538.14 (4) and concurrence by the department **under s. NR 538.14(5)** are needed. ~~If the department does not respond to the notification within 10 business days, concurrence is considered to be granted.~~ **Industrial byproducts shall be used in accordance with ASTM D7765-18a when foundry sand is used for structural fill or embankments, the Wisconsin department of transportation specifications for highway and structure construction, or other appropriate best management practices. Industrial byproducts shall be used in accordance with best management practices.** The criteria and uses under this subsection are as follows:

(a) ~~Base course, subbase or s~~ **Subgrade** fill for the construction of commercial, industrial or non-residential institutional buildings **provided the design and use of the building prevents the percolation of liquid through the byproduct layer.** ~~The placement of the industrial byproduct may not extend more than 4 feet beyond the outside edge of the concrete slab or the frostwalls of the building.~~ Placement of the concrete floor or frostwalls shall be completed as soon as practical after placement of the fill material **in accordance with s. NR 538.12(4).** Any area where industrial byproducts are not directly beneath the building shall be sloped to prevent ponding of water **and** covered with 2 feet of native soil. **The upper six inches shall consist of including** topsoil and seeded **or other cover as approved by the department in writing and placed** as soon after placement as is practical. **Final vegetated slopes may not be steeper than a 3:1 horizontal to vertical incline.** The use of industrial byproducts as ~~base course, subbase and~~ subgrade fill in the construction of residential buildings is specifically prohibited.

(b) ~~Base course, subbase or s~~ **Subgrade** fill for the construction of a portland cement concrete or asphaltic concrete paved lot. ~~The placement of the industrial byproduct may not extend more than 4 feet beyond the paved area.~~ Placement of the pavement shall be completed as soon as practical after placement of the fill material. Any area where industrial byproducts are not directly beneath the pavement structure shall be sloped to prevent ponding of water, covered with 2 feet of native soil including topsoil and seeded as soon after placement as is practical. The fill may not exceed 3000 cubic yards per half acre of the project area. The depth of fill may not exceed 4 feet below the natural ground surface. Prior written notification in accordance with s. NR 538.14 (4) and written concurrence by the department **under s. NR 538.14(5)** are needed for fills that do not meet the criteria in this subsection. ~~Concurrence by the department will be based on specific site conditions and good engineering practice. If the department does not respond~~

~~to the notification within 10 business days, concurrence is considered to be granted. The use of industrial byproducts as paved lot fill is prohibited in residential areas.~~

~~(8c) Unconfined g~~**Geotechnical fill material with a soil or gravel cover** used as fill material for sight, sound, **safety** and structural berms, ~~reclamation of nonmetallic mines, public recreational trails, construction of sporting venues, limited use parking areas, access lanes, utility trenches or other beneficial uses demonstrated to be acceptable by the department. Any area where industrial byproducts are beneficially used as unconfined geotechnical fill~~ **with a soil or gravel cover** shall be sloped to prevent ponding of water, covered with 2 feet of native soils including **a minimum of 6 inches of topsoil**, or other cover approved by the department **in writing**, and seeded as soon as practical after placement of the industrial byproducts. **Final vegetated slopes may not be steeper than a 3:1 horizontal to vertical incline. Gravel or other granular material may be substituted for topsoil if necessary provided the total fill cover is at least 2 feet.** ~~Written notification in accordance with s. NR 538.14 (4) and concurrence by the department are needed for all unconfined geotechnical fills. Concurrence by the department will be based on specific site conditions and good engineering practice. If the department does not respond to the notification within 10 business days, concurrence is considered to be granted. The beneficial use of industrial byproducts as geotechnical fill with a soil or gravel cover as an unconfined geotechnical fill is prohibited in residential areas.~~

(d) Use at livestock operations as liner material for feed and manure storage structures or subgrade geotechnical fill under livestock barns.

1. Liner material used for agricultural waste storage structures at livestock operations that have less than 1000 Animal Units and have not applied for a Wisconsin pollution prevention discharge elimination system (WPDES) permit under s. NR 243. The agricultural waste storage structures shall be designed and constructed in accordance with applicable Natural Resources Conservation Service Standards and approved under any applicable local ordinances.

2. Liner material used for feed and agricultural waste storage structures at livestock operations that have 1000 or more Animal Units and have applied for or received a WPDES Permit under NR 243. The agricultural waste storage structures shall be designed, approved and constructed in accordance with applicable NR 243 requirements.

3. Fill material is eligible for use as geotechnical fill beneath structures used for livestock housing provided the design includes provisions for installation of a paved asphalt or concrete floor in all animal access and manure accumulation areas.

Note: Natural Resources Conservation Service (NRCS) conservation practice standard Code 313 applies to the construction of waste storage facilities and NRCS conservation practice Code 629 applies to construction of feed storage pads. Copies of these and other conservation practice codes can be obtained online from the NRCS Field Office Technical Guide, www.nrcs.usda.gov/wps/portal/nrcs/site/wi/home. Copies are also

available at the Wisconsin NRCS State Office or the Wisconsin Land and Water Conservation Association Office

~~(7e) Clay capped and sidewalled. Transportation facility embankments constructed under the authority of the Wisconsin department of transportation, or a municipality, that meet the criteria in this subsection. Examples include linear roadway sound and sight barrier berm embankments, airport embankments and roadway bridge or overpass embankments. Excluding areas covered by pavement or road shoulder material, any area where industrial byproducts are beneficially used as an embankment shall be sloped to prevent ponding of water, covered with 2 feet of native soils including a minimum of 6 inches of topsoil, or other cover approved by the department in writing, and seeded with an approved Wisconsin department of transportation seed mix as soon as practical after placement of the industrial byproducts. Final vegetated slopes may not be steeper than a 3:1 horizontal to vertical incline. For projects using more than 100,000 cubic yards of industrial byproducts, or with a maximum thickness of industrial byproduct greater than 20 feet, department concurrence shall be obtained prior to initiating the project. The construction, documentation and monitoring of these embankments shall be as described under sub. (6) (b) 2. to (i). and as follows:~~

~~(a) The embankment shall be monitored in accordance with s. NR 538.20 (3).~~

~~(b) The embankment shall be covered on the top and sidewalls by 2 feet of recompacted clay compacted to a minimum of 95% standard dry Proctor density at a moisture content wet of optimum, based on the characteristics of the appropriate Proctor curve for the clay being placed. The sidewalls and top cover shall be a minimum of 2 feet thick. No liner is required.~~

(f) Geotechnical fill material used in the reclamation of nonmetallic mining sites. Any area where industrial byproducts are beneficially used in the reclamation of a nonmetallic mine site shall be sloped to prevent ponding of water, covered with 2 feet of native soils including a minimum of 6 inches of topsoil, or other cover approved by the department in writing, and seeded in accordance with the reclamation plan as soon as practical after placement of the industrial byproducts. Final vegetated slopes may not be steeper than a 3:1 horizontal to vertical incline. Prior written notification in accordance with s. NR 538.14 (4) and concurrence by the department under s. NR 538.14(5) are required for all nonmetallic mine reclamation projects. Mine reclamation projects at mine sites that formerly quarried dolomitic rock shall be subject to a case-specific approval in accordance with s. NR 538.09.

1. The use of fill materials at nonmetallic mining sites with a permit issued under ch. NR 135 shall be in accordance with the approved reclamation plan required under s. NR 135.19. If the reclamation plan does not specify the use of industrial byproducts as fill material, the plan shall be modified in accordance with s. NR 135.24 to reflect the use of these byproducts. The reclamation plan or modification must be approved by the regulatory authority before applying for concurrence by the department.

2. Nonmetallic mining sites not subject to ch. NR 135 requirements that are proposing the use of industrial byproducts as part of mine reclamation shall submit a reclamation plan prepared in accordance with s. NR 135.19(1) to (4) for the portion of the mine site that will accept fill material to the department. Mine reclamation projects at mine sites that do not have an approved reclamation plan issued under s. NR 135 and that propose using more than 10,000 cubic yards of industrial byproduct fill material shall be subject to a case-specific approval in accordance with s. NR 538.09.

3. For all nonmetallic mine sites, geotechnical fill shall not be placed within 5 feet of the post-reclamation water table level or the pre-mining water table level if a post-reclamation water table level is not determined in the reclamation plan.

4. The beneficial use of industrial byproducts in the reclamation of nonmetallic mines is prohibited in residential areas or areas where residential construction is planned as a post-reclamation land use.

(3) Construction uses in accordance with the project criteria and uses specified in this subsection.

(ea) ~~Base course, subbase or s~~ Subgrade fill for the construction of a paved federal, state or municipal roadway. Industrial byproducts placed as part of construction of the paved federal, state or municipal roadway may not extend beyond the subgrade shoulder point and the depth of the fill may not exceed 4 feet except for incidental sections of the fill. Any area where industrial byproducts are not directly beneath the pavement structure shall be sloped to prevent ponding of water, covered with base course or native soil including topsoil and seeded as soon as practical after placement of the industrial byproduct. Placement of the pavement structure shall be completed as soon as practical after placement of the fill material. ~~For fills greater than 4 feet in depth using category 4 industrial byproducts, the design criteria in sub. (6) shall be required. For fills greater than 4 feet in depth using category 3 or less industrial byproducts, the design criteria in sub. (7) s. 538.10(2)(e) shall be required.~~ The use of industrial byproducts as paved roadway ~~subbase or base~~ **subgrade** fill is prohibited in residential areas, unless used in a roadway designed with a rural type cross-section **without curbs and gutters**.

(b) **Base aggregates for the construction of a paved federal, state or municipal roadway that meet the Wisconsin department of transportation Section 301 standard specifications for base aggregates. The use of industrial byproducts as paved roadway base aggregate is prohibited in residential areas, unless used in a roadway designed with a rural type cross-section without curbs and gutters.**

(~~dc~~) Utility trench backfill. The industrial byproducts placed as part of backfill of a trench constructed for the placement of sanitary or storm sewer, non-potable water line, gas main, telecommunications, electrical or other utility lines shall be beneath a paved roadway, parking lot or other portland cement concrete or asphaltic concrete paved structure. The industrial byproducts may not extend more than 4 feet beyond the pavement structure. Any area where industrial byproducts are not directly beneath the

pavement structure shall be sloped to prevent ponding of water, topsoiled and seeded as soon as practical after placement of the industrial byproduct.

~~(e) Bridge abutment backfill. Industrial byproducts placed as part of bridge abutment backfill shall be covered by a roadway structure. Any area where industrial byproducts are not directly beneath the pavement surface shall be sloped to prevent ponding of water, covered with base course or topsoiled and seeded as soon as practical after placement of the industrial byproduct. The use of industrial byproducts as bridge abutment trench backfill is prohibited in residential areas, unless used in a roadway designed with a rural type cross-section.~~

~~(f) Abandonment of tanks, vaults or tunnels that will provide total encapsulation of the industrial byproduct. This use does not include the placement of an industrial byproduct in a location where environmental pollution has been identified unless it is specified in a plan approval by the department.~~

~~(g) Slabjacking material. Industrial byproducts used as a component in a slabjacking material in combination with portland cement, lime or bentonite shall be placed beneath portland cement concrete paved structures to raise areas that have settled. The slabjacking material shall be placed directly from an enclosed transport vehicle. Projects using more than 2 cubic yards of industrial byproduct as a slabjacking material is prohibited in residential areas.~~

~~(h) Soil and pavement stabilization. Industrial byproducts used as soil and pavement base stabilization for structural improvements listed in pars. (a) to (c) shall be used in accordance with ASTM C618-0315, or the Wisconsin department of transportation specifications for highway and structure construction, or other good engineering practices acceptable to approved by the department in writing. The use of industrial byproducts as soil and pavement base stabilization is allowed in residential areas for those beneficial uses specified in par. (e) if approved by the local unit of government with jurisdiction over the roadway.~~

Note: ASTM C618-0315 is the American society for testing and materials "Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete." Copies of this test procedure can be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, (610) 832-9585, www.astm.org. Copies of the standard are also available for inspection at the offices of the Department of Natural Resources, the Secretary of State and the Legislative Reference Bureau.

~~(i) Controlled low strength material (flowable fill). Industrial byproducts incorporated into controlled low strength material for structural improvements listed in pars. (a), (d), (e) and (f) shall be used in accordance with ACI 229R-99 or the Wisconsin department of transportation specifications for highway and structure construction, or other good engineering practices acceptable to the department.~~

~~(4h)~~ Bonded surface course material used in accordance with the criteria of this subsection. This use includes placement of industrial byproducts as a bonded surface course material such as seal coats **and chip seals** in paved federal, state or municipal roadways, **commercial and private roadway or parking surfaces, driveways, airport runways and trails** specified in sub. (5)(e). Industrial byproducts used as a bonded surface course shall conform to the Wisconsin department of transportation standard specifications for highway and structure construction applicable to asphaltic pavements, **including limitations on the percentage of material passing the P200 sieve and application rates**. Within 48 hours of application of the industrial byproduct, the surface shall be rolled to thoroughly embed these materials into the asphaltic mastic. ~~If more than 10,000 cubic yards of industrial byproducts are to be used in an individual bonded surface course application, prior written notification in accordance with s. NR 538.14 (4) and concurrence by the department are needed. If the department does not respond to the notification within 10 business days, concurrence is considered to be granted. The use of industrial byproducts as seal coats is prohibited in residential areas, unless used in a roadway designed with a rural type cross-section.~~

Note: ACI 229R-99 is the American Concrete Institute report "Controlled Low Strength Materials." Copies of this report can be obtained from the American Concrete Institute, P.O. Box 9094, Farmington Hills, MI 48333, (248) 848-3800, www.concrete.org. Copies of this report are also available for inspection at the offices of the Department of Natural Resources, Bureau of Waste Management, 101 S. Webster Street, P.O. Box 7921, Madison, Wisconsin 53707-7921. Copies are available for inspection at the offices of the Legislative Reference Bureau and the Secretary of State.

~~Note: ACI 229R-94 is the American Concrete Institute report "Controlled Low Strength Materials." Copies of this report can be obtained from the American Concrete Institute, P.O. Box 19150, Detroit, Michigan 48219-0150. Copies of this report are also available for inspection at the offices of the Department of Natural Resources, Bureau of Waste Management, 101 South Webster Street, Natural Resources Building, P.O. Box 7921, Madison, Wisconsin 53707-7921. Copies are available for inspection at the offices of the Legislative Reference Bureau and the Secretary of State.~~

Note: ASTM D7765-12 is the American Society for Testing and Materials "Standard Practice for Use of Foundry Sand in Structural Fill and Embankments". Copies of this test procedure can be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, (610) 832-9585, www.astm.org. Copies of the standard are also available for inspection at the offices of the Department of Natural Resources, the Secretary of State and the Legislative Reference Bureau.

~~(6) Fully encapsulated transportation facility embankments constructed under the authority of the Wisconsin department of transportation, or a municipality, that meet the criteria in this subsection. Examples include linear roadway sound and sight barrier berm embankments, airport embankments and roadway bridge or overpass embankments. For projects using more than 100,000 cubic yards of industrial byproducts, or with a maximum thickness of industrial byproduct greater than 20 feet, department concurrence~~

shall be obtained prior to initiating the project. These embankments shall be constructed, documented and monitored as follows:

~~(a) The embankment shall be monitored in accordance with s. NR 538.20 (2).~~

~~(b) The embankment shall be covered on the top and sidewalls by 2 feet of recompacted clay, and underlain by a 3-foot thick recompacted clay liner. The recompacted clay base, sidewalls and top cover shall meet the following specifications:~~

~~1. A minimum thickness of 3 feet under the entire base and 2 feet on the sidewalls and top compacted to a minimum of 95% standard dry proctor density at a moisture content wet of optimum, based on the characteristics of the appropriate proctor curve for the clay being placed.~~

~~2. A classification of CL or CH under the unified soil classification system.~~

~~3. A permeability of 1×10^{-7} cm/sec or less, when compacted to 95% standard maximum dry proctor density or greater.~~

~~4. An average liquid limit of 25% or greater with no values less than 20%, when tested in accordance with ASTM D4318-95.~~

~~5. An average plasticity index of 12% or greater with no values less than 10%, when tested in accordance with ASTM D4318-95.~~

~~6. A minimum of 50% by weight that passes the 200 sieve.~~

~~Note: ASTM D4318-95 is the American society for testing and materials "Test Method for Liquid Limit, Plastic Limit and Plasticity Index for Soils." Copies of this test procedure can be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, (610) 832-9585, www.astm.org. Copies of the standard are also available for inspection at the offices of the Department of Natural Resources, the Secretary of State and the Legislative Reference Bureau.~~

~~(c) Any portion of the clay top cover or sidewalls of the embankment not covered by the pavement structure, which includes base course and pavement, shall be covered by one foot of cover soil that includes a minimum of 4 inches of topsoil.~~

~~(d) Documentation testing for the recompacted clay base, sidewalls and top cover shall be as follows:~~

~~1. Field density and moisture content testing shall be performed on a uniform grid pattern for each lift of clay placed with the grid pattern offset on each subsequent lift. A lift may not exceed 8 inches in thickness following compaction. One density test shall be performed for each 40,000 ft² of surface area for every 8 inch lift of clay placed on the~~

base and top cover. One density test shall be performed for each 60,000 ft² of surface area for every 8 inch lift of clay placed on the sideslopes offset on each subsequent lift.

~~2. A disturbed soil sample shall be obtained for one of every 3 field test locations in subd. 1. and analyzed in a laboratory for atterberg limits and grain size to the 2 micron particle size. An undisturbed soil sample shall be obtained for one of every 9 field test locations in subd. 1. and analyzed for laboratory permeability.~~

~~3. A standard proctor curve, ASTM D698-91, shall be developed for each distinct soil source and type in order that density testing can be correlated to the appropriate soil type.~~

~~4. Monitoring devices including headwells, and associated borehole construction shall be documented using the appropriate department forms: monitoring well construction form #4400-113A (rev. 4-90), soil boring log information form #4400-122 (rev. 7-91) and well information form #4400-89 (rev. 1-90).~~

~~Note: ASTM D698-91 is the American society for testing and materials "Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort." Copies of this test procedure can be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, (610) 832-9585, www.astm.org. Copies of the standard are also available for inspection at the offices of the Department of Natural Resources, the Secretary of State and the Legislative Reference Bureau.~~

~~Note: Copies of these forms may be obtained from the Department of Natural Resources, Bureau of Waste Management, 101 South Webster Street, Natural Resources Building, P.O. Box 7921, Madison, Wisconsin 53707-7921.~~

~~(e) Within 90 business days of completion of the construction project, a site construction report shall be prepared and 3 copies sent to the department. Two of these reports shall be submitted to the bureau of waste management and one shall be submitted to the department's field office responsible for the area in which the embankment is located. The report shall include all of the following:~~

~~1. A plot plan showing final grades actually achieved in the field, and the location of all soil tests, drainage ditches, surface water drainage control structures, monitoring wells, control points and any other pertinent features.~~

~~2. Documentation of the depth of the final cover material utilizing a 200-foot grid pattern. All borings shall be replaced with acceptable material and compacted to proper density. Hand auger or survey data may be used for this documentation.~~

~~3. Documentation of the type and quantity of fertilizer, mulch and seed used on the side slopes.~~

~~4. Documentation of the quantity and source of the industrial byproduct used in the embankment fill.~~

~~5. The final perpendicular cross-sections of the completed embankment. These cross-sections shall indicate the extent of the industrial byproduct placement.~~

~~6. Typical detailed drawings of any special design features.~~

~~7. An appendix containing all the raw data from the soil testing program.~~

~~8. A description of the institutional controls that will be in place to ensure that the structural integrity of the embankment will be maintained, and that any future disturbances of the embankment design features will be repaired.~~

~~(f) The final cover and topsoil shall be smoothly graded to enhance positive surface runoff and seeded, fertilized and mulched to establish a thick vegetative growth. Routine maintenance of the embankment slopes shall be performed to insure the integrity of the final soil cover.~~

~~(g) A perimeter berm shall be constructed within the limits of the prepared clay base to contain any surface water runoff from the industrial byproduct. The berm shall be maintained throughout the period of industrial byproduct placement.~~

~~(h) Measures shall be taken to limit blowing and tracking of the industrial byproduct during transportation to the construction site and placement in the embankment. Measures include keeping the industrial byproduct moist, and compacting it as soon as it is deposited in the fill area.~~

~~(i) The department's field office responsible for the area in which the embankment is located shall be contacted at least one week prior to initiating construction of the clay liner so that arrangements can be made for inspecting the site.~~

(4) Unconfined uses that are not fully contained, encapsulated, or covered by either 2-foot of soil or an impervious surface and meet the project criteria and uses specified in this subsection.

(9a) Unbonded surface course material used in accordance with the criteria of this subsection. This includes the use of industrial byproducts as a surface course material in unpaved driveways, **road shoulders, farm lanes**, parking areas and recreation or exercise trails. Industrial byproducts used as surface course shall conform to the requirements of Wisconsin department of transportation standard specifications for highway and structure construction applicable to base materials, and may be placed at a cumulative thickness of 6 inches or less and in areas separated by at least a 25 foot vegetated buffer to a navigable surface water. The use of industrial byproducts as unbonded surface course is prohibited in residential areas. ~~If more than 1000 cubic yards of industrial byproducts or more than 6 inches are to be used in an individual surface course application, prior written notification in accordance with s. NR 538.14 (4) and concurrence by the department are needed. If the~~

department does not respond to the notification within 10 business days, concurrence is considered to be granted.

~~(10) Bonded surface course material used in accordance with the criteria of this subsection. This use includes placement of industrial byproducts as a bonded surface course material such as seal coats in roads, driveways, parking areas and recreational or exercise trails. Industrial byproducts used as a bonded surface course shall conform to the Wisconsin department of transportation standard specifications for highway and structure construction applicable to asphaltic pavements. Within 48 hours of application of the industrial byproduct, the surface shall be rolled to thoroughly embed these materials into the asphaltic mastic. If more than 10,000 cubic yards of industrial byproducts are to be used in an individual bonded surface course application, prior written notification in accordance with s. NR 538.14 (4) and concurrence by the department are needed. If the department does not respond to the notification within 10 business days, concurrence is considered to be granted.~~

~~(12) Decorative stone applications using industrial byproducts shall conform to Wisconsin department of transportation specifications for highway and structure construction applicable to base aggregates.~~

(13b) Winter weather road abrasive on roadways with a rural cross-section, including areas with incidental sections of curb and gutter. The winter road abrasives using industrial byproducts, wholly or as part of a mixture of abrasives and de-icing compounds, shall meet Wisconsin department of transportation gradation and application rate recommendations for winter highway maintenance contained in the state highway maintenance manual.

(5) Soil or plant additives to be managed, applied and licensed in accordance with the Wisconsin department of agriculture, trade and consumer protection ch. ATCP 40, Subchapter II or ATCP 41 requirements. Initial certification and concurrence by the department in accordance with s. NR 538.06 shall be required for all soil or plant additives used in accordance with this section. In addition to the certification information, the applicant shall demonstrate, as part of the required written notification, the following:

- (a) The byproduct, as demonstrated through research projects approved under s. NR 518.04(2) or previously published research, has value as a soil or plant additive and will not result in detrimental effects to the soil or vegetation at the rates and mixtures proposed. If the additive is part of a mixture, the physical and chemical nature of the other materials in the mixture must be described in the submittal as well as the relative percentages of each material.
- (b) The byproduct or byproduct mixture will not be applied at rates such that excessive accumulation of hazardous substances occur in soil or vegetation, or cause a detrimental effect on surface water quality, or cause a detrimental effect on groundwater quality that would result in an exceedance of the groundwater quality standards in s. NR 140.

- (c) The byproduct or byproduct mixture will be applied in accordance with accepted agricultural practices.
- (d) Byproducts that are intended for use as agricultural liming materials meet the requirements of ATCP 41 and do not contain contaminant concentrations exceeding the values listed in Table 3 of s. NR 204.07(5)(c).
- (e) Flue gas desulfurization material intended for use as an agricultural soil amendment does not contain contaminant concentrations exceeding the values listed in Appendix I, Table 2 and will not be applied in excess of the maximum recommended application rates as determined by the Wisconsin department of agriculture, trade and consumer protection.

Note: USDA Code 333 is the guidance document “Amending Soil Properties with Gypsum Products”, Natural Resources Conservation Service, Conservation Practices Standard Code 333 (333-CPS-1), June 2015 available through the United States Department of Agriculture website:
“[https://efotg.sc.egov.usda.gov/references/public/OH/Amending_Soil_Properties_with_Gypsum_Products_Standard_\(333\).pdf](https://efotg.sc.egov.usda.gov/references/public/OH/Amending_Soil_Properties_with_Gypsum_Products_Standard_(333).pdf)”.

Note: Copies of Wisconsin department of transportation specifications for highway and structure construction, and state highway maintenance manual can be obtained from the Department of Natural Resources, Bureau of Waste Management, 101 South Webster Street, Natural Resources Building, P.O. Box 7921, Madison, Wisconsin 53707-7921. Copies are also available for inspection at the offices of the Legislative Reference Bureau and the Secretary of State.

Note: Under s. 30.2022, Stats., highway and bridge projects affecting the waters of the state that are carried out under the direction and supervision of the department of transportation are exempt from department permit or approval requirements if accomplished in accordance with interdepartmental liaison procedures established by the Department of Natural Resources and the department of transportation.

NR 538.12 ~~Beneficial uses for specific categories~~ **Additional criteria for the beneficial use of industrial byproducts as geotechnical fill.**

~~(1) Persons who beneficially use category 1 to 5 industrial byproducts in accordance with this section are exempt from licensing under s. 289.31, Stats., and the regulatory requirements under chs. NR 500 to 538.~~

~~(2) General criteria for uses:~~

~~(a1)~~ All **geotechnical fill** uses shall comply with the performance standards under s. NR 538.04 and the applicable criteria in this section. **In addition, geotechnical fill may not be**

placed in an area that meets the definition of a floodplain under s. NR 500.03(87) without prior written approval from the department.

~~(b2)~~ Materials that are not category 1 industrial byproducts and that are utilized for any of the uses under s. NR 538.10 (52) ~~to (13)~~ may not be placed:

a. ~~below the water table, into~~ **Within areas of** permanent standing water or areas that need to be dewatered prior to placement.

b. **Within 3 feet of the groundwater table at the time of placement.**

c. For those beneficial uses listed in s. NR 538.10 (52) ~~(a) and (b)~~ that exceed 5000 cubic yards, there shall be a minimum separation distance of ~~3~~ **5** feet between the industrial byproducts and the groundwater table at the time the material is placed. Prior written notification in accordance with s. NR 538.14 (4) and concurrence by the department are needed for separation distances less than 5 feet. Concurrence by the department will be based on specific site conditions and good engineering practice. ~~If the department does not respond to the notification within 10 business days, concurrence is considered to be granted.~~

~~(b3)~~ Materials that are not category 1 industrial byproducts and used for the beneficial uses listed in s. NR 538.10 (52) ~~(a) and (b)~~ and exceed 5000 cubic yards shall be placed no closer than ~~2~~ **100** feet from a private or public water well without the written **concurrence from the department.** ~~consent of the property owners located within this separation distance. A consent form shall be provided by the department. Concurrence by the department will be based on specific site conditions such as well construction and ground water flow direction.~~

~~(c)~~ All uses shall meet all applicable structural and physical specifications and generally accepted engineering practices for the use.

(4) Beneficial use projects utilizing fill materials under s. NR 538.10(2) shall be completed, including the placement of final cover, within one year of first accepting industrial byproduct material. If the beneficial use project requires more than one year, the project shall be planned in phases with each year's worth of filling completed and interim or final cover placed prior to initiation of filling the next phase. Concurrence of alternate cover strategies may be granted by the department based on site-specific conditions and good engineering practices.

(5) Confining surfaces and soil covers in beneficial use projects utilizing fill materials under s. NR 538.10(2) shall be maintained as designed. Fill materials exposed by erosion, excavation or weathering shall be covered in accordance with the original design, or as approved by the department, as soon as practical. Requests for modification of the final cover shall be made in accordance with s. NR 538.14(6) and excavation of fill material in accordance with s. NR 538.24.

(6) Beneficial use projects proposing utilization of 100,000 cubic yards or more of geotechnical fill materials under s. NR 538.10(2) shall apply to the department for a case-specific approval in accordance with s. NR 538.09.

(7) All vegetated soil covers over geotechnical fill materials under s. NR 538.10(2) shall utilize topsoil of sufficient quantity and quality to support a vegetative cover that prevents erosion.

~~(e) All beneficial use projects shall be conducted in a manner to minimize windblown dust, odor, tracking and spillage of the industrial byproduct and not to cause nuisance conditions or environmental pollution as defined under s. 289.01 (8), Stats.~~

~~(3) Uses for category 1 industrial byproducts. Category 1 industrial byproducts may be utilized for any beneficial uses described under s. NR 538.10 (1) to (13), or other beneficial uses which conform with the exposure assumptions listed in s. NR 720.19 (5) (e) 1. a. and 2. a. Category 1 industrial byproducts are exempt from the notification requirements under s. NR 538.14 (4), the environmental monitoring requirements under s. NR 538.20 and the property owner notification requirements under s. NR 538.22.~~

~~Note: Section NR 720.19 was repealed.~~

~~(4) Uses for category 2 industrial byproducts. Category 2 industrial byproducts may be used for any of the beneficial uses described under s. NR 538.10 (1) to (13).~~

~~(5) Uses for category 3 industrial byproducts. Category 3 industrial byproducts may be used for any of the beneficial uses described under s. NR 538.10 (1) to (8) and (11).~~

~~(6) Uses for category 4 industrial byproducts. Category 4 industrial byproducts may be used for any of the beneficial uses described under s. NR 538.10 (1) to (6).~~

~~(7) Uses for category 5 industrial byproducts. Category 5 industrial byproducts may be used for any of the beneficial uses described under s. NR 538.10 (1) to (4).~~

NR 538.14 Reporting.

(1) Initial certification. Prior to beneficial use of industrial byproducts under this chapter, or the establishment of a storage facility as required under s. NR 538.16 (1) (c), each generator, storage facility operator, or their designee shall submit an initial certification form to the department **for concurrence in accordance with s. NR 538.06(1)** ~~that contains the information listed below.~~ An initial certification form shall be submitted prior to beneficial use in accordance with this chapter for any industrial byproducts not previously ~~classified~~ **approved for eligible uses**, for any industrial byproduct for which the ~~classification~~ **generation process** has changed or for the establishment of a storage facility for industrial byproducts. The initial certification form shall include the following information:

(a) Name and address of generator or storage facility operator.

(b) Name, address and telephone number of designated generator or storage facility operator contact.

(c) A description of each industrial byproduct intended for beneficial use or storage that clearly identifies the process that generated it and an estimate of the volume that could be made available for beneficial use on an annual basis.

(d) The ~~classification~~ **eligible uses** of each industrial byproduct to be beneficially used or stored for beneficial use in accordance with s. NR 538.08~~10~~ **and Appendix I, Tables 1-2**. Documentation, including test results supporting the **classification eligible uses**, shall be included. **Non-exempt storage facilities may under s. NR 538.16(1)(c) shall provide the name and address of the generators of the industrial byproducts to be stored unless the storage facility is located at the same address as the industrial byproduct generating facility as an alternative to this documentation.**

(e) Authorization for Wisconsin department of natural resources staff to conduct inspections of the facilities generating industrial byproducts being beneficially used under this chapter or storage facilities for these industrial byproducts, and collect samples to verify compliance with this chapter.

(f) Certification by each generator, storage facility operator or their designee, that the information on the form is true and accurate, and that the performance standards of s. NR 538.04 will be met.

Note: Copies of this form may be obtained from the Department of Natural Resources, Bureau of Waste Management, 101 South Webster Street, Natural Resources Building, P.O. Box 7921, Madison, Wisconsin 53707-7921.

(2) Annual certification. Each generator of industrial byproducts that have been beneficially used under this chapter, operator of a **non-exempt** storage facility for industrial byproducts as required under s. NR 538.16 (1) (c), or their designee, shall submit an annual certification, **electronically or** on a form supplied by the department, that documents the amount of material beneficially used ~~in each category~~ **for each eligible use** in the previous calendar year and confirms the proper ~~classification~~ **use** of each industrial byproduct. The certification form shall be submitted no later than April 1 of the year following the reporting period. The annual certification form shall include the following information:

(a) Name and address of generator or storage facility operator.

(b) Name, address and telephone number of the designated generator or storage facility operator contact.

(c) A description of each industrial byproduct intended for beneficial use or storage that clearly identifies the process **and location of the generating facility**, ~~that generated it and an estimate of the volume that could be made available for beneficial use on an annual basis.~~

(d) The volume of each industrial byproduct that was beneficially used, ~~or the change in the volume stored,~~ during the reporting period, identified by ~~category~~ **types of beneficial uses per s. NR 538.10**. **If the industrial byproduct was given or sold to an entity other than the generator for subsequent use or distribution, the name and address of the recipient shall be listed along with the volume they received and the intended beneficial uses.**

(e) **For non-exempt storage facilities, the volume of each industrial byproduct that was in storage as of December 31st of the reporting year.**

(f) ~~The classification of each industrial byproduct to be beneficially used or stored for beneficial use in accordance with s. NR 538.08. Documentation, including test results supporting the classification~~ **any required recharacterization as specified under s. NR 538.06(4), shall be included. Non-exempt storage facilities may under s. NR 538.16(1)(c) shall provide the name and address of the generators of the industrial byproducts to be stored unless the storage facility is located at the industrial byproduct generating facility as an alternative to this documentation.**

(g) ~~A summary of any problems or obstacles encountered in the beneficial use of the industrial byproducts and the actions taken in response to these concerns.~~

(h) A summary of the performance, problems and maintenance associated with any storage facilities in accordance with s. NR 538.16 (1) (c).

(i) ~~The environmental monitoring data collected for beneficial use projects in accordance with s. NR 538.20.~~

(j) Certification by the generator, storage facility operator or their designee, that the information on the form is true and accurate, and that the performance standards of s. NR 538.04 have been met.

Note: Copies of this form may be obtained from the Department of Natural Resources, Bureau of Waste Management, 101 South Webster Street, Natural Resources Building, P.O. Box 7921, Madison, Wisconsin 53707-7921.

(3) Exemption. Subsection (2) does not apply if the volume of the generator's industrial byproducts beneficially used, or stored for future use, during the reporting period was less than 1000 cubic yards.

(4) Notification. Each industrial byproduct generator or a person designated by the generator, such as a broker, shall submit written notification to the department prior to

initiating a project, where required in s. NR 538.10 (52), (8), (9), (10) or (11). The following information shall be included in the notification:

- (a) The name, address and phone number of the contact for the project.
- (b) The location of the project and a site description including a topographic or orthophoto map, township and range to the quarter section, and land use information. In addition, the applicant shall submit geographic information system locational information based on no fewer than 6 geographically informative points that define the limits of industrial byproduct placement. These points shall be collected using the North American Datum, NAD83(1991). For each point, the longitude and latitude shall be referenced to the 5th decimal degree. The date, method and tools used to collect locational information for each point shall also be included. Other methods of geolocation that provide similar or better accuracy are also acceptable, subject to approval by the department.
- (c) The approximate volume of industrial byproduct anticipated to be used in the project.
- (d) The anticipated start and end dates for the project along with the timing of any phasing.
- (e) Identification of the types and generators of the industrial byproduct or byproducts to be used and the category eligible uses of these materials.
- (f) Information demonstrating that the proposed project will meet the performance standards in s. NR 538.04 and beneficial use specifications in s. NR 538.10.
- (g) For those beneficial uses listed in s. NR 538.10 (52) (a) and (b) that exceed 5000 cubic yards, the method and the data used to determine the groundwater separation distance.
- (h) A copy of the property owner notification form required in s. NR 538.22.
- (i) For those beneficial uses subject to the public notification requirement under s. NR 538.18, proof that a public notice was placed in the local newspaper in accordance with s. NR 538.18(1)(a).

Note: Proof of a public notice may include a copy of the notice clipped from the newspaper along with the date it was published, or any other notification verifying that an order for the public notice was placed with the newspaper and the expected date of publication.

(5) For proposed projects that require submission of a written notification, the department shall reply with a written concurrence within 10 business days provided the applicant meets the applicable criteria of this chapter. If the applicant cannot demonstrate that the proposed project will meet these criteria, the department will provide a written

notice of non-concurrence within 10 business days noting any deficiencies and allowing the applicant an opportunity to correct them or provide additional information. If the department does not respond to the notification within 10 business days, concurrence is considered granted.

(6) Modifications. Any industrial byproduct generator or their designee that wishes to modify a project that was previously issued a concurrence decision by the department under sub. (5) shall notify the department in writing describing the nature of the modification requested. The department shall review the modification request and notify the applicant in writing when a revised concurrence under s. NR 538.14(4) is required.

Note: The department may require submission of a revised notification if the proposed modification alters the original project footprint, substantially increases the volume of byproduct material, or has the potential to affect any of the performance standards under s. NR 538.04.

(57) Record keeping. The generator of an industrial byproduct or their designee, shall maintain records of where their industrial byproduct has been utilized under this chapter for one or more of the beneficial uses described under s. NR 538.10 (~~52~~) ~~to (8)~~. These records shall be maintained and be accessible to department staff upon request, for 5 years after the use of the industrial byproduct.

NR 538.16 Storage and transportation requirements.

(1) Storage. Storage of industrial byproducts for beneficial use shall meet the performance standards listed in s. NR 538.04. These storage facilities shall also meet the criteria in this subsection unless exempt under par. (a).

(a) The following industrial byproduct storage facilities are exempt from the requirements of this subsection:

1. Facilities for the storage of industrial byproduct within enclosed structures such as buildings, silos or ~~green~~ covered roll-off boxes.
2. Facilities for the storage of industrial byproducts within a lined area at a licensed engineered landfill ~~that is owned or operated by the user, generator of the byproduct or a person designated by the generator, such as a broker.~~
3. ~~Facilities for the storage of only category 1 industrial byproducts.~~ Municipal maintenance and storage facilities that stockpile no more than 300 cubic yards of industrial byproduct material at any given time. The stored material shall be contained by perimeter berms or curbs. These facilities shall be operated and maintained to minimize dust, off-site tracking and manage storm water runoff.
4. Facilities for the temporary off-site storage or staging of ~~category 2 or 3~~ industrial byproducts to be used beneficially in accordance with s. NR 538.10. These temporary

facilities shall be operated and maintained to minimize dust, off-site tracking and storm water runoff. Industrial byproducts shall not remain in temporary off-site storage or staging areas for more than one year after the date of their placement without written concurrence by the department. ~~that are used for industrial byproduct storage for less than 2 years. These facilities shall provide to the department notice of the storage location, the date on which the storage of materials began, and the total volume stored.~~

5. Facilities for which the department issues an exemption on a case specific basis.

(b) Storage of industrial byproducts not exempt under par. (a) shall meet all of the following design and operational criteria:

1. Areas intended for the storage of industrial byproducts that have been determined to contain greater than the concentrations specified for the parameters listed in ch. NR 538 Appendix I, Table 1A ~~The storage area shall incorporate an lined low permeability, asphalt, concrete, or clay impervious surface pad and be surrounded by curbs or berms to control surface water run-on and run-off. Alternately, If if a low permeability clay pad surface is used, it shall include a protective material cover of, at a minimum, one foot of gravel or an equivalent material over the clay.~~

2. ~~Means shall be provided for collecting, containing and treating the volume of run-off expected to come in contact with the stored material as a result of the 25-year, 24-hour storm event. Water contact with the stored material shall be minimized, such as by covering with a tarp, where practical.~~ Storage facilities shall be operated and maintained to minimize dust, off-site tracking and storm water runoff. The storage area shall be clearly delineated and lined on 3 sides with curbs, blocks or berms designed to prevent spillage and contain the byproduct to the designated storage area. A setback shall be maintained between the stored material and the entrance to the storage area to prevent spillage of material and to reduce off-site tracking.

3. ~~A setback shall be maintained between the stored materials and the edge of the pad to prevent spillage of materials off the pad and allow for vehicle movement completely around stored material.~~

(c) The operators of storage facilities not exempt under par. (a) shall provide the department an ~~initial and~~ annual certification in accordance with s. NR 538.14, ~~including~~ a summary of storage facility performance, problems and maintenance in the annual certification under s. NR 538.14 (2) (g), ~~and an affirmation that the impervious or low permeability surface pad, if required, still meets the design criteria in s. NR 538.16(b)(1).~~

(d) ~~Upon~~ Closure of an industrial byproduct storage facility, ~~shall include provisions to remove~~ all visible residues shall be removed from the storage area.

Note: The discharge of stormwater is regulated under ch. NR 216.

(2) Transportation. Vehicles **or containers** used to transport industrial byproducts intended for beneficial use shall meet ~~both~~**all** of the following criteria:

(a) ~~Vehicles or containers used to transport industrial byproducts shall~~ **Designed and built to** be durable and leak-proof. ~~Vehicles and containers shall be~~ **and** repaired ~~on an as needed basis~~ **maintained** to prevent nuisance conditions from occurring.

(b) ~~Vehicles or containers used to transport industrial byproducts shall be~~ **Loaded and** hauled in such a manner that the contents do not fall, spill or leak; **including the use of** ~~covers shall be provided to prevent littering and spillage as necessary.~~ Any spilled industrial byproducts shall be properly recovered.

Note: Storage and transportation of industrial byproduct in accordance with this chapter is exempt from the storage and transportation requirements of ch. NR 502 as specified in ss. NR 502.05 (3) (i) and 502.06 (2) (k).

NR 538.18 Public participation.

(1) Notification. Except as provided in sub. (2), no person may initiate a beneficial use project where the volume of the industrial byproduct to be used is greater than 30,000 cubic yards, or construct or operate a **permanent or temporary** storage facility with a design capacity greater than 30,000 cubic yards, prior to the person giving notice to the affected public and providing for adequate public participation. Unless other forms of public notification and involvement are approved by the department **in writing**, the notice and public participation process provided by the person intending to initiate a beneficial use project or storage facility shall include, at a minimum, the following:

(a) Placing a public notice in the local newspaper at least 30 business days prior to initiating an industrial byproduct beneficial use project or storage facility, specifying the nature of the beneficial use project or storage facility, including the type and amount of the material to be used or stored, how and where the material will be used, the time frame of the project or storage facility operation, that the person intending to initiate the beneficial use project or storage facility may hold a public informational meeting **either electively or if requested**, and a contact person for the public to request a meeting.

(b) Holding a public informational meeting, if requested by the public, at which details of the project can be discussed. Department staff may participate in the meeting.

Note: The public informational meeting would not be considered an informational hearing per ss. 289.26, Stats. even if Department staff elected to participate.

(2) Exemptions.

(a) The following beneficial use projects are exempt from the public participation requirements under this section:

1. ~~Beneficial use of category 1 industrial byproducts.~~ **Beneficial uses described under s. NR 538.10(1), (3), (4) and (5).**

2. Wisconsin department of transportation beneficial use projects that were addressed in the department of transportation's environmental review process.

3. Beneficial use projects at facilities licensed under chs. NR 500 to 538.

4. ~~Beneficial uses described under s. NR 538.10 (1) to (4).~~

(b) The following beneficial use storage facilities are exempt from the public participation requirements under this section:

1. Storage facilities ~~that are~~ located on the property where the industrial byproducts are generated

2. Storage facilities that are licensed under ch. NR 502.

3. ~~Storage facilities for category 1 industrial byproducts.~~ **Municipal maintenance and storage facilities under s. NR 538.16(a)(3).**

NR 538.20 Environmental monitoring.

(1) ~~Transportation facility embankments described in s. NR 538.10 (6) or (7) shall be monitored in accordance with this section unless otherwise approved by the department. The generator of the industrial byproduct used in the embankment shall be responsible for ensuring that this monitoring is completed. The results of this environmental monitoring shall be included in the annual certification under s. NR 538.14 (2) (h).~~ The department may require environmental monitoring for ~~other~~ beneficial use projects subject to this chapter that do not meet the beneficial uses described in s. NR 538.10 **or are subject to a case-specific approval under s. NR 538.09.**

(2) ~~Fully encapsulated transportation facility embankments. Environmental monitoring for embankments that are fully encapsulated under s. NR 538.10 (6) shall be conducted as follows:~~

~~(a) One headwell shall be installed if less than 50,000 cubic yards of industrial byproducts are used in the embankment. A second headwell shall be installed if 50,000 cubic yards or more of industrial byproducts are used in the embankment.~~

~~(b) The head elevation in each headwell shall be monitored twice each year at least 4 months apart. If the head level on the liner exceeds 2 feet, the department shall be notified. This notification shall include an evaluation of the reason for the head level build up and a proposed response to reduce the head level on the liner.~~

~~(3) Capped transportation facility embankment. The environmental monitoring for embankments that are capped and not lined under s. NR 538.10 (7), shall be conducted as follows:~~

~~(a) One basin lysimeter shall be installed with a collection area of 100 square feet. The lysimeter shall be placed directly below the industrial byproduct, and shall be located so that it will be beneath the thickest placement of the industrial byproduct.~~

~~(b) The volume of fluid collected in a basin lysimeter shall be monitored and recorded twice each year at least 4 months apart. If the volume of liquid collected in a basin lysimeter exceeds 375 gallons in one year the department shall be notified. This notification shall include an evaluation as to the reason for the volume of liquid being collected, an analysis of the liquid collected for all the parameters listed ch. NR 538 Appendix I, Table 2A and a proposed response to reduce the volume of liquid exfiltrating through the industrial byproduct.~~

NR 538.22 Property owner notification.

(1) Written notice shall be provided to ~~the~~ **all** owners of property on which **any amount of** industrial byproducts are utilized under this chapter for one or more of the beneficial uses described under s. NR 538.10 ~~(§ 2) to (9)~~. This notice shall be provided to the owner of property prior to its use. The generator of the industrial byproduct, or a person designated by the generator, shall provide the notice in accordance with this section, unless the department approves an alternative notice procedure. This notice shall be on a form provided by the department or in a format approved by the department **in writing**. Any property owner receiving this notice shall retain this information and provide this information to the next purchaser of the property. ~~Category 1 industrial byproducts are exempt from the requirements of this section. Category 2 industrial byproducts are exempt from the requirements listed in this section for beneficial use projects of less than 2500 cubic yards provided that the owner of the property is informed in writing that industrial byproducts are being utilized.~~

(2) Property owner notifications shall include the following information:

(a) The type, volume, and generator of the industrial byproduct(s) used as geotechnical fill on the property.

(b) The location of the project and a site description including a topographic or orthophoto map, township and range to the quarter section, or geographic information system locational information that defines the location of industrial byproduct placement.

(c) Affirmation that the generator or their designee has discussed the contents of this notice with the property owner and has provided them with a copy.

(3) A copy of the property owner notification form shall be submitted to the department prior to placement of any industrial byproduct material.

Note: Copies of this form may be obtained **electronically or** from the Department of Natural Resources, Bureau of Waste Management, 101 South Webster Street, Natural Resources Building, P.O. Box 7921, Madison, Wisconsin 53707-7921.

~~(2) Small-sized beneficial use projects. For projects that utilize no more than 200 cubic yards of industrial byproducts, the notification shall identify the category, type, volume of industrial byproduct and describe where these materials were placed.~~

~~(3) Medium-sized beneficial use projects. For projects that utilize more than 200 cubic yards but no more than 10,000 cubic yards of industrial byproducts, the notification shall include the information required in sub. (1), and a sketch or drawing that shows the approximate boundaries of the areas where industrial byproducts were used.~~

(4) Large-sized beneficial use projects. For projects that utilize more than 10,000 cubic yards of industrial byproducts, the notification shall include an affidavit recorded with the register of deeds, within 60 business days of completing the placement of the industrial byproduct, indicating that industrial byproducts were used on the property, and an indication where the information required in subs. (1) ~~and (2)~~, may be obtained.

Note: Under s. 30.2022, Stats., highway and bridge projects affecting the waters of the state that are carried out under the direction and supervision of the department of transportation are exempt from department permit or approval requirements if accomplished in accordance with interdepartmental liaison procedures established by the Department of Natural Resources and the department of transportation.

NR 538.24 Excavation of existing geotechnical fill.

(1) Owners of property where industrial byproducts had previously been used as geotechnical fill in accordance with the provisions of ch. NR 538, or their designee, may petition the department to excavate and re-use or dispose of the industrial byproduct material provided they meet the provisions of this section.

(2) The property owner or their representative shall submit a written notification to the department in accordance with s. NR 538.14(5) for re-use of the existing geotechnical fill. The notification shall contain the following information:

(a) Name, address and contact information for the property owner and their representative or consultant.

(b) Information demonstrating that the existing geotechnical fill had been placed as a beneficial use project in accordance with ch. NR 538. This information may include a copy of the concurrence letter from the department, a copy of the owner notification notice required per s. NR 538.22, location on a database maintained by the department for locating beneficial use projects, or other proof as accepted by the department.

(c) Location of the existing geotechnical fill material and the proposed extent of the excavation and relocation of the material.

(d) The proposed reuse including a demonstration it will meet the applicable standards in s. NR 538.04 and s. NR 538.10.

(3) If any excavated geotechnical fill material will be disposed rather than re-used, the property owner or their designee shall provide to the department in writing the information required under s. NR 538.24(2)(a-c) as well as the name of the disposal facility and volume of disposed material within 60 days of completion of the project.

(4) If the excavated material is to be beneficially used on a property other than the original fill site, the property owner of the re-use site shall be notified in accordance with s. NR 538.22. A public notice shall also be issued in accordance with s. NR 538.18 for excavated material re-use projects with a design capacity greater than 30,000 cubic yards.

(5) Minor excavations of 1000 cubic yards or less of geotechnical fill material that had previously been approved under the provisions of s. NR 538, shall be exempt from the requirements of s. NR 538.24(2) provided the excavated fill material is either reused in accordance with s. NR 538.04 and an eligible beneficial use per s. NR 538.10 or disposed in a landfill. Any remaining fill material shall be covered with a confining surface or soil cover in accordance an eligible use under s. NR 538.10(2)(a-f).

Table 1A
Initial Certification and Recertification
Water Leach Test
ASTM D3987-12

Standard (mg/L)	Parameter	Foundry System Sand	Coal Ash	FGD Gypsum	Other
0.03	Antimony	X	X	X	X
0.05	Arsenic	X	X	X	X
10	Barium		X		X
0.02	Beryllium	X	X		X
10	Boron		X	X	X
0.025	Cadmium	X	X		X
1250	Chloride		X		X
0.5	Chromium, Total	X	X		X
0.065	Cobalt	X	X		X
6.5	Copper	X			X
20	Fluoride		X	X	X
0.075	Lead	X	X		X
1.5	Manganese			X	X
0.01	Mercury		X	X	X
0.4	Molybdenum		X		X
0.5	Nickel	X			X
50	Nitrite + Nitrate (as N)				X
10	Phenol	X			X
0.25	Selenium		X	X	X
1250	Sulfate		X		X
0.01	Thallium		X	X	X
0.75	Vanadium				X
125	Zinc				X

Notes:

- Standards are based on a 5x multiplier of the s. NR 140 Wis. Adm. Code Enforcement Standard values for each parameter.
- Standards for boron, cobalt, barium, and molybdenum are based on a 5x multiplier of anticipated revisions to their Enforcement Standard values.

Table 1B
Initial Certification and Recertification
Bulk Analysis

Standard (mg/kg)	Parameter	Foundry System Sand	Coal Ash	FGD Gypsum	Other
97.3	Antimony	X	X	X	X
8	Arsenic	X	X	X	X
8600	Barium		X		X
122	Beryllium	X	X	X	X
43600	Boron		X		X
104	Cadmium	X	X		X
1.9	Chromium, Hexavalent	X	X	X	X
35.2	Cobalt	X			X
52	Lead	X	X		X
13.7	Mercury		X	X	X
1220	Molybdenum		X		X
264	Nickel	X			X
1210	Selenium		X	X	X
2.4	Thallium		X	X	X
773	Vanadium		X		X
73000	Zinc				X
19.9	Benz(a)anthracene	X			X
2.0	Benzo(a)pyrene	X			X
20	Benzo(b)fluoranthene	X			X
200	Benzo(k)fluoranthene	X			X
2000	Chrysene	X			X
2	Dibenzo(ah)anthracene	X			X
20	Indeno(123-cd)pyrene	X			X
75.8	1-methyl naphthalene	X			X
628	2-methylnaphthalene	X			X
25.1	Naphthalene	X			X
4710	Pyrene	X			X

Notes:

Standards based on Dept. of Health modelling results.

Table 2
FGD Byproduct for Soil or Plant Additive Standards
Total Elemental Analysis

Parameter	Standard (mg/kg)
Antimony	1.5
Arsenic	13.1
Barium	1000
Beryllium	2.5
Boron	200
Cadmium	1.0
Chromium (Total)	100
Copper	95
Lead	30
Manganese	1500
Mercury	2.5
Molybdenum	10
Nickel	100
Selenium	50
Thallium	1.0
Vanadium	136
Zinc	125

Notes:

Values are derived from the NRCS Conservation Practice Standard Code 333, June, 2015

Table 3

Beneficial Use Methods		Must contain less than the concentration specified for the parameters in the following Appendix I Tables:		
		1A	1B	2
NR 538.10				
(1)	Contained or Converted Uses (a) Encapsulated uses (b) Waste stabilization or solidification (c) Supplemental fuels (d) Daily cover	---	---	---
(2)	Geotechnical Fill (a) Building sub-base (b) Paved lot sub-base (c) Soil/gravel cover (d) Feed and manure storage structures (e) Transportation embankments (f) Non-metallic mine reclamation	X	---	---
(3)	Construction Uses (a) Paved roadway base course (b) Base aggregates (c) Utility trench backfill (d) Tank, vault or tunnel abandonment (e) Slabjacking material (f) Soil and pavement base stabilization for structural improvements (g) Flowable fill for structural improvements (h) Bonded surface course	---	---	---
(4)	Unconfined uses (a) Unbonded Surface Course (b) Winter road abrasives	X	X	---
(5)	Soil or Plant Additives (a) Flue gas desulphurization material (b) Agricultural liming agents ¹	---	---	X

Notes:

1 – Byproducts intended for use as agricultural liming agents must contain concentrations less than the values listed in s. NR 204.07(5)(c).