Chapter NR 538

BENEFICIAL USE OF INDUSTRIAL BYPRODUCTS

NR 538.01 Purpose. The purpose of this chapter is to allow and encourage to the maximum extent possible, consistent with the protection of public health and the environment and good engineering practices, the beneficial use of industrial byproducts in a nuisance–free manner. 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.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98.

NR 538.02 Applicability. (1) Except as otherwise provided, this chapter governs the beneficial use of industrial byproducts, except hazardous waste and metallic mining waste.

(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 state and local laws and codes, however, may apply to the beneficial use of industrial byproducts regulated under this chapter.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98.

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" 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) "Confined geotechnical fill" means a fill that is covered by an impervious surface such as concrete or asphalt.

(3) "Flue gas desulfurization" means the material recovered from air pollution control systems that capture sulfur dioxide emissions from energy recovery facilities.

(4) "Industrial byproduct" means papermill sludge, ash from energy recovery including coal ash and slag, material captured in flue gas desulfurization systems, ferrous and steel foundry excess system sand and slag, lime kiln dust or non–hazardous solid waste with similar characteristics as determined by the department.

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

(6) "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.

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

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

(9) "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.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98; CR 05–020: renum. (2) to (6) to be (4) and (6) to (9) and am. (4) and (6), cr. (2), (3), (5) and (10) Register January 2006 No. 601, eff. 2–1–06.

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.

(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 445.03.

Note: The placement of materials in a floodplain where an obstruction to flood flows or an increase in regional flood event or an adverse affect 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.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98; CR 05–020: am. (2) Register January 2006 No. 601, eff. 2–1–06.

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 536.

(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.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98.

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 under s. NR 538.08. The results of this characterization shall be reported to the department as specified in s. NR 538.14. The testing program for materials not specifically listed in tables 1A to 3 shall be approved

by the department prior to characterization. For those materials not listed in tables 1A to 3 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.

(2) INITIAL CHARACTERIZATION. A representative sample of an industrial byproduct shall be properly characterized prior to beneficial use to determine its category under s. NR 538.08.

(3) CHARACTERIZATION METHODS. (a) The limits of detection used in the characterization shall be at or below the concentration listed in tables 1A to 3 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. 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 be determined not to be a hazardous waste as defined under s. NR 600.03 (98) using a method specified under ch. NR 605.

(c) All industrial byproducts which are characterized to determine eligibility for category 1 to 4 under s. NR 538.08 (1) to (4) shall be analyzed using ASTM D3987−85 water leach test.

(d) All industrial byproducts which are characterized to determine eligibility for category 1 or 2 under s. NR 538.08 (1) or (2) shall be analyzed using a total elemental analysis, unless another analysis method is approved by the department.

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 revisor of statutes. 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.gpoaccess.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 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, West Conshohocken, PA 19428−2959, (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 revisor of statutes.

(4) RECHARACTERIZATION. (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. 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 result in a change of the category of the industrial byproduct.

(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.

(d) A representative sample of each category 3 industrial byproduct shall be recharacterized in the same manner as specified for the initial characterization once every 3 years. 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.

History: Cr. Register, December, 1997, No. 504, eff. 1−1−98; CR 05−020: am. (3) (c) Register January 2006 No. 601, eff. 2−1−06.

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:

(1) CATEGORY 1 INDUSTRIAL BYPRODUCTS. Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in Appendix I, Tables 1A and 1B, are category 1 industrial byproducts.

(2) CATEGORY 2 INDUSTRIAL BYPRODUCTS. Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in 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 polyaromatic 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.

(3) CATEGORY 3 INDUSTRIAL BYPRODUCTS. Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in 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 Appendix I, Table 2A.

(4) CATEGORY 4 INDUSTRIAL BYPRODUCTS. Industrial byproducts that have been determined to contain less than the concentration specified for the parameters listed in Appendix I, Table 3, and are not category 1 to 3 industrial byproducts are category 4 industrial byproducts.

(5) CATEGORY 5 INDUSTRIAL BYPRODUCTS. Industrial byproducts that have been determined not to be a hazardous waste as defined in s. NR 600.03 (98) and are not category 1 to 4 industrial byproducts are category 5 industrial byproducts.

(6) CRITERIA AND PROCESS FOR USING CATEGORY STANDARDS. (a) If a standard for a parameter listed in 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 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 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.

(7) CASE SPECIFIC. 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 (4) and assign a category or categories 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.

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.

History: Cr. Register, December, 1997, No. 504, eff. 1−1−98; CR 05−020: am. (3) and (7) Register January 2006 No. 601, eff. 2−1−06.

NR 538.10 Beneficial uses. The beneficial uses of industrial byproducts under this chapter which may be exempt from regulation as provided under s. NR 538.12 are:

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

(2) 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 by the department.

(3) Supplemental fuels that provide energy through controlled burning.

(4) 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 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.

(5) Confined geotechnical fill material in accordance with the project criteria and uses specified in this subsection. 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 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 best management practices. The criteria and uses under this subsection are as follows:

(a) *Base course, subbase or subgrade fill for the construction of commercial, industrial or non−residential institutional buildings.* 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. Any area where industrial byproducts are not directly beneath the building 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 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 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 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.

(c) *Base course, subbase or 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) shall be required. The use of industrial byproducts as paved roadway subbase or base fill is prohibited in residential areas, unless used in a roadway designed with a rural type cross−section.

(d) *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 yard 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 C618−03, or the Wisconsin department of transportation specifications for highway and structure construction, or

other good engineering practices acceptable to the department. The use of industrial byproducts as soil and pavement base stabilization is allowed in residential areas for those beneficial uses specified in par. (c) if approved by the local unit of government with jurisdiction over the roadway.

Note: ASTM C618−03 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 revisor of statutes.

(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.

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 revisor of statutes and the secretary of state.

(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 x 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 revisor of statutes.

(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 ft^2 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 ft^2 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 revisor of statutes.

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.

(7) 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. 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.

(8) Unconfined geotechnical fill material used as fill material for sight, sound 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 shall be sloped to prevent ponding of water, covered with 2 feet of native soils including topsoil, or other cover approved by the department, and seeded as soon as practical after placement of the industrial byproducts. Prior 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 an unconfined geotechnical fill is prohibited in residential areas.

(9) 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, 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.

(11) 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 paved federal, state or municipal roadways specified in sub. (5) (c). 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. 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.

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

(13) 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, shall meet Wisconsin department of transportation gradation and application rate recommendations for winter highway maintenance contained in the state highway maintenance manual.

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 revisor of statutes 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.

History: Cr. Register, December, 1997, No. 504, eff. 1−1−98; CR 05−020: am. (5) (a) to (d), (f), (7) (b), (8) to (10), renum. (11) and (12) to be (12) and (13) and am., cr. (5) (h), (i) and (11) Register January 2006 No. 601, eff. 2−1−06.

NR 538.12 Beneficial uses for specific categories of industrial byproducts. (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 536.

(2) GENERAL CRITERIA FOR USES. (a) All uses shall comply with the performance standards under s. NR 538.04 and the applicable criteria in this section.

(b) Materials that are not category 1 industrial byproducts and that are utilized for any of the uses under s. NR 538.10 (5) to (13) may not be placed below the water table, into permanent standing water or areas that need to be dewatered prior to placement. For those beneficial uses listed in s. NR 538.10 (5) (a) and (b) that exceed 5000 cubic yards, there shall be a minimum separation dis-

tance of 3 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.

(br) Materials that are not category 1 industrial byproducts and used for the beneficial uses listed in s. NR 538.10 (5) (a) and (b) and exceed 5000 cubic yards shall be placed no closer than 200 feet from a private or public water well without the written consent of the property owners located within this separation distance. A consent form shall be provided by the department.

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

(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.

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 revisor of statutes and the secretary of state.

(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) (c) 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.

(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).

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98; CR 05–020: am. (2) (b), r. (2) (d), cr. (2) (br) Register January 2006 No. 601, eff. 2–1–06; **correction in (3), (4) and (5) made under s. 13.93 (2m) (b) 7., Stats., Register May 2006 No. 605.**

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 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, for any industrial byproduct for which the classification 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 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, shall be included. Storage facilities may provide the name and address of the generators of the industrial byproducts to be stored 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 storage facility for industrial byproducts as required under s. NR 538.16 (1) (c), or their designee, shall submit an annual certification, on a form supplied by the department, that documents the amount of material beneficially used in each category in the previous calendar year and confirms the proper classification 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 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.

(e) The classification of each industrial byproduct in accordance with s. NR 538.08. Documentation of any recharacterization test results required under s. NR 538.06 (4) shall be included. Storage facilities may provide the name and address of the generators of the industrial byproducts to be stored as an alternative this documentation.

(f) 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.

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

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

(i) 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 (5), (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.

(c) The approximate volume of industrial byproduct anticipated to be used in the project.

(d) The anticipated start and end dates for the project.

(e) Identification of the industrial byproduct or byproducts to be used and the category of these materials.

(f) For those beneficial uses listed in s. NR 538.10 (5) (a) and (b) that exceed 5000 cubic yards, the method and the data used to determine the groundwater separation distance.

(5) 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 (5) 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.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98; CR 05–020: am. (4) (intro.), cr. (4) (f) Register January 2006 No. 601, eff. 2–1–06.

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 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.

4. Facilities for the storage of category 2 or 3 industrial byproducts 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. The storage area shall incorporate a lined low–permeability, asphalt, concrete, or clay pad and be surrounded by curbs or berms to control surface water run–on and run–off. If a clay pad is used, it shall include protective 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.

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, include a summary of storage facility performance, problems and maintenance in the annual certification under s. NR 538.14 (2) (g).

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

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

(2) TRANSPORTATION. Vehicles used to transport industrial byproducts intended for beneficial use shall meet both of the following criteria:

(a) Vehicles or containers used to transport industrial byproducts shall be durable and leak–proof. Vehicles and containers shall be repaired on an as needed basis 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. 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).

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98; CR 05–020: am. (1) (a) 4. Register January 2006 No. 601, eff. 2–1–06.

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 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, 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, 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.

(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.

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 536.

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.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98.

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 sub-

ject to this chapter that do not meet the beneficial uses described in s. NR 538.10.

(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 Appendix I, Table 2A and a proposed response to reduce the volume of liquid exfiltrating through the industrial byproduct.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98.

NR 538.22 Property owner notification. (1) Written notice shall be provided to the owners of property on which industrial byproducts are utilized under this chapter for one or more of the beneficial uses described under s. NR 538.10 (5) 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. 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.

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) 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. 30.12 (4), 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.

History: Cr. Register, December, 1997, No. 504, eff. 1–1–98; CR 05–020: am. (1) Register January 2006 No. 601, eff. 2–1–06.

APPENDIX I

Table 1A

Category 1 ASTM Water Leach Test

Standard (mg/l)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other[1]
1.5	Aluminum (Al)	X	X	X	X
0.0012	Antimony (Sb)	X	X	X	X
0.005	Arsenic (As)	X	X	X	X
0.4	Barium (Ba)	X	X	X	X
0.0004	Beryllium (Be)	X	X	X	X
0.19	Boron (B)			X	X
0.0005	Cadmium (Cd)	X	X	X	X
125	Chloride (Cl)			X	X
0.010	Chromium, Tot. (Cr)	X	X	X	X
0.130	Copper (Cu)	X	X	X	X
0.040	Total Cyanide	X	X		X
0.8	Fluoride (F)	X	X		X
0.15	Iron (Fe)	X	X	X	X
0.0015	Lead (Pb)	X	X	X	X
.025	Manganese (Mn)	X	X	X	X
0.0002	Mercury (Hg)	X	X	X	X
0.05	Molybdenum (Mo)			X	X
0.020	Nickel (Ni)	X	X	X	X
2.0	Nitrite & Nitrate (NO_2+NO_3−N)			X	X
1.2	Phenol	X			X
0.010	Selenium (Se)	X	X	X	X
0.010	Silver (Ag)			X	X
125	Sulfate	X	X	X	X
0.0004	Thallium (Tl)	X	X	X	X
2.5	Zinc (Zn)	X	X	X	X

[1] As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry system sand, ferrous foundry slag and coal ash must be approved by the department prior to characterization. For other materials 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: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

Table 1B

Category 1 Total Elemental Analysis

Standard (mg/kg)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other[1]
6.3	Antimony (Sb)	X	X	X	X
0.042	Arsenic (As)	X	X	X	X
1100	Barium (Ba)		X	X	X
0.014	Beryllium (Be)	X	X	X	X
1400	Boron (B)			X	X
7.8	Cadmium (Cd)			X	X
14.5	Chromium, Hex. (Cr)	X	X	X	X
50	Lead (Pb)		X	X	X
4.7	Mercury (Hg)			X	X
78	Molybdenum (Mo)			X	X
310	Nickel (Ni)			X	X
9400	Phenol				X
78	Selenium (Se)				X
9400	Silver (Ag)				X
9400	Strontium (Sr)				X
1.3	Thallium (Tl)	X	X	X	X
110	Vanadium (V)			X	X
4700	Zinc (Zn)			X	X
900	Acenaphthene	X		X	X
8.8	Acenaphthylene	X		X	X
5000	Anthracene	X		X	X
0.088	Benz(a)anthracene	X		X	X
0.0088	Benzo(a)pyrene	X		X	X
0.088	Benzo(b)fluoranthene	X		X	X
0.88	Benzo(ghi)perylene	X		X	X
0.88	Benzo(k)fluoranthene	X		X	X
8.8	Chrysene	X		X	X
0.0088	Dibenz(ah)anthracene	X		X	X
600	Fluoranthene	X		X	X
600	Fluorene	X		X	X
0.088	Indeno(123−cd)pyrene	X		X	X
8.8	1−methyl naphthalene	X		X	X
8.8	2−methyl naphthalene	X		X	X
600	Naphthalene	X		X	X
0.88	Phenanthrene	X		X	X
500	Pyrene	X		X	X

[1] As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry system sand, ferrous foundry slag and coal ash must be approved by the department prior to characterization. For other materials 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: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

Table 2A

Category 2 and 3 ASTM Water Leach Test

Standard (mg/l)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other [1]
0.012	Antimony (Sb)	X	X	X	X
0.05	Arsenic (As)	X	X	X	X
4.0	Barium (Ba)	X	X	X	X
0.004	Beryllium (Be)	X	X	X	X
1.9	Boron (B)			X	X
0.005	Cadmium (Cd)	X	X	X	X
1250	Chloride (Cl)				X
0.10	Chromium, Tot. (Cr)	X	X	X	X
1.30	Copper (Cu)				X
0.40	Total Cyanide				X
8.0	Fluoride (F)	X			X
1.5	Iron (Fe)	X	X		X
0.015	Lead (Pb)	X	X	X	X
.25	Manganese (Mn)	X	X	X	X
0.002	Mercury (Hg)	X	X	X	X
0.20	Nickel (Ni)				X
20	Nitrite & Nitrate (NO_2+NO_3–N)				X
12	Phenol	X			X
0.10	Selenium (Se)	X	X	X	X
0.10	Silver (Ag)			X	X
1250	Sulfate			X	X
0.004	Thallium (Tl)			X	X
25	Zinc (Zn)				X

1 As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry system sand, ferrous foundry slag and coal ash must be approved by the department prior to characterization. For other materials 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: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

Table 2B

Category 2 Total Elemental Analysis

Standard (mg/kg)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other[1]
21	Arsenic (As)	X	X	X	X
7	Beryllium (Be)	X	X	X	X
	Acenaphthene	X		X	X
	Acenaphthylene	X		X	X
	Anthracene	X		X	X
44	Benz(a)anthracene	X		X	X
4.4	Benzo(a)pyrene	X		X	X
44	Benzo(b)fluoranthene	X		X	X
	Benzo(ghi)perylene	X		X	X
	Benzo(k)fluoranthene	X		X	X
	Chrysene	X		X	X
4.4	Dibenz(ah)anthracene	X		X	X
	Fluoranthene	X		X	X
	Fluorene	X		X	X
44	Indeno(123−cd)pyrene	X		X	X
	1−methyl naphthalene	X		X	X
	2−methyl naphthalene	X		X	X
	Naphthalene	X		X	X
	Phenanthrene	X		X	X
	Pyrene	X		X	X
100[2]	Total PAHs	X		X	X

1 As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry slag, ferrous foundry slag and coal ash must be approved by the department prior to characterization. Also, for industrial byproducts not listed, department concurrence is necessary prior to classification as a category 2 industrial byproduct. For other materials 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. For these materials the total elemental analysis shall also include aluminum, antimony, barium, boron, cadmium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, phenol, selenium, silver, strontium, thallium, vanadium and zinc, unless otherwise approved by the department.

2 If total polyaromatic hydrocarbons exceed 100 mg/kg, department concurrence is necessary prior to classification as a category 2 industrial byproduct.

Note: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

Table 3

Category 4 ASTM Water Leach Test

Standard (mg/l)	Parameter	Ferrous Foundry Excess System Sand	Ferrous Foundry Slag	Coal Ash	Other[1]
0.03	Antimony (Sb)				X
0.25	Arsenic (As)				X
10	Barium (Ba)	X			X
0.02	Beryllium (Be)				X
4.8	Boron (B)			X	X
0.025	Cadmium (Cd)	X	X	X	X
2500	Chloride (Cl)				X
0.5	Chromium, Total (Cr)			X	X
6.5	Copper (Cu)				X
1	Total Cyanide				X
20	Fluoride (F)				X
3	Iron (Fe)	X	X		X
0.075	Lead (Pb)	X	X		X
0.5	Manganese (Mn)				X
0.01	Mercury (Hg)	X	X		X
0.5	Nickel (Ni)				X
50	Nitrite & Nitrate (NO_2+NO_3–N)				X
30	Phenol				X
0.25	Selenium (Se)			X	X
0.25	Silver (Ag)			X	X
2500	Sulfate			X	X
0.01	Thallium (Tl)				X
50	Zinc (Zn)				X

1 As provided under s. NR 538.06 (1), the testing program for materials other than ferrous foundry system sand, ferrous foundry slag and coal ash must be approved by the department prior to characterization. For other materials 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: All testing is to be conducted on a representative sample of a single industrial byproduct prior to commingling with other materials, unless otherwise approved by the department.

Table 4

Beneficial Use Methods

	Industrial Byproduct Category				
	5	4	3	2	1
(1) Raw Material for Manufacturing a Product	X	X	X	X	X
(2) Waste Stabilization / Solidification	X	X	X	X	X
(3) Supplemental Fuel Source / Energy Recovery	X	X	X	X	X
(4) Landfill Daily Cover / Internal Structures	X	X	X	X	X
(5) Confined Geotechnical Fill (a) commercial, industrial or institutional building subbase (b) paved lot base, subbase & subgrade fill (c) paved roadway base, subbase & subgrade fill (d) utility trench backfill (e) bridge abutment backfill (f) tank, vault or tunnel abandonment (g) slabjacking material (h) soil and pavement base stabilization (i) controlled low strength material (flowable fill)		X	X	X	X
(6) Encapsulated Transportation Facility Embankment		X	X	X	X
(7) Capped Transportation Facility Embankment			X	X	X
(8) Unconfined Geotechnical Fill			X	X	X
(9) Unbonded Surface Course				X	X
(10) Bonded Surface Course				X	X
(11) Bonded Surface Course (Federal, state or municipal roadways)			X	X	X
(12) Decorative Stone				X	X
(13) Cold Weather Road Abrasive				X	X
Note: General beneficial use in accordance with s. NR 538.12 (3)					X

Note: Refer to s. NR 538.10 for description of each beneficial use