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Title: Use of Foundry Sand in Land Application and as a Soil Amendment

Identification Number: WASTE-0040-NPD

Date Originally Adopted: April 20, 2000

Dates Revised: None

Other Policies Repealed or Amended: none

Brief Description of Subject Matter: Uses of type III foundry sand in land application operations and as a soil amendment that are allowed without a permit as authorized by Senate Enrolled Act 495, and that are in compliance with state law and protective of the environment.

Citations Affected: IC 13-11-2-114.2; IC 13-19-3-7; PL 30-1999, SEC. 5 (noncode)

This nonrule policy document is intended solely as guidance and does not have the effect of law or represent formal Indiana Department of Environmental Management (IDEM) decisions or final actions. This nonrule policy shall be used in conjunction with applicable laws. It does not replace applicable laws; if it conflicts with these laws, the laws shall control. A revision to this nonrule policy document may be put into effect by IDEM thirty (30) days after the revised nonrule policy document is made available for public inspection and comment and presented to the Solid Waste Management Board and the Water Pollution Control Board. IDEM will submit revisions to the Indiana Register for publication.

Policy Statement

Introduction

Senate Enrolled Act 495 (P.L. 30-1997, effective July 1, 1999) allows two new uses for foundry sand without requiring a permit: in land application and as a soil amendment. That act directed IDEM to develop a Foundry Sand Task Force to discuss the technical issues associated with environmentally sound use of foundry sand in land application and as a soil amendment and to develop this nonrule policy guidance document ("guidance document"). This guidance document was prepared by IDEM with the aid of the Foundry Sand Task Force. If this guidance document is followed, no permit for using type III foundry sand in land application or as a soil amendment will be required. Other rules and policies allowing the use of foundry sand include: "Use of Foundry Sands in Accordance with House Enrolled Act 1541" nonrule policy document (WASTE-0028-NPD), which does not require additional total metals analysis; the Land Application Permitting Program authorized by 327 IAC 6; and disposal of type IV waste in accordance with 329 IAC 10-3-4.

In order to qualify for use under this guidance document, foundry sand must be adequately demonstrated to meet type III criteria under 329 IAC 10-9. This means it must have been determined to be solid (i.e., non-hazardous) waste in accordance with waste determination procedures found in 329 IAC 10-7.1 and it must have received from IDEM a waste classification establishing that contaminant levels are below the concentration limits for type III restricted waste under 329 IAC 10-9-4(b)(2). Three (3) samples with level III analytical data quality ("ADQ") must be used for initial testing of the foundry sand. Subsequent testing requirements may be reduced or waived if consistency in chemical composition of the foundry sand waste stream is demonstrated. Information concerning level III ADQ may be found in "Solid Waste Program Analytical Data Deliverable Requirements: A Guidance Document" nonrule policy document, OSHWM General ID#0038-01-SW. Guidance on waste determination and

classification is available from IDEM.

Foundry sand adequately demonstrated to meet type III criteria under 329 IAC 10-9 may be used in accordance with this guidance document without obtaining a permit in land application or as a soil amendment if the land application or soil amendment does not include the operation of a landfill and if the foundry sand or the product using foundry sand as a soil amendment is demonstrated to contain acceptable levels of metals in accordance with this policy.

Uses of type III foundry sand in land application or as a soil amendment not authorized by this guidance document may, nonetheless, be approved by IDEM as research and demonstration projects under the requirements set forth in 327 IAC 6.1-4-19. The analytical data submitted must be of the same quality required by this guidance document. If the ceiling concentration limits, annual or lifetime land application rates, soil amendment product concentration limits, or other applicable contaminant limits established in this guidance document are exceeded, the submission must include a rationale for exceeding the limits. If a research or demonstration project proposes using type III foundry sand as a soil amendment, it need not name a location or owner of property upon which the soil amendment product will be used, but must indicate the type and amount of other materials used to make the soil amendment product.

Definitions

The following terms are defined for the purposes of this guidance document only:

Floodway. "Floodway," as set forth in IC 14-8-2-102, means the channel of a river or stream and the parts of the flood plain adjoining the channel that are reasonably required to efficiently carry and discharge the flood water or flood flow of a river or stream. Please consult the Indiana Department of Natural Resources for information concerning the floodway boundary for specific streams or rivers.

Food crop. "Food crop" means any crop or crops grown for:

- (1) human consumption; or
- (2) consumption by animals whose products are consumed by humans.

Food crops include fruits, vegetables, seeds, grains, and tobacco.

Foundry sand. "Foundry sand" means used or spent core or molding sands. The term does not include the following:

- (1) refractory;
- (2) slag;
- (3) grinding dust or sludge;
- (4) equipment or vehicle maintenance waste;
- (5) baghouse dust, except for waste solely from molding sand handling systems;
- (6) scrubber sludge;
- (7) shot blast dust;
- (8) unused cores;
- (9) metal scrap;
- (10) pattern shop waste; and
- (11) solvents.

Land application. "Land application," means the direct surface and/or subsurface application of type III foundry sand in-situ to soil, which sand is evenly applied on or evenly incorporated into the land in accordance with generally accepted agricultural or horticultural practices. Foundry sand used in land application is "land applied."

Soil amendment. "Soil amendment" means type III foundry sand that has been mixed with one (1) or more other materials to form a product, which product could then be sold, re-mixed, applied to the land, or otherwise used as

soil or a soil substitute in accordance with generally accepted agricultural or horticultural practices. The term excludes type III foundry sand that has been mixed with any amount of:

- (1) solid waste, as that term is defined by IC 13-11-2-205(a), that is not type III foundry sand;
- (2) hazardous waste, as that term is defined by IC 13-11-2-99;
- (3) a hazardous substance, as that term is defined by IC 13-11-2-98; or
- (4) petroleum, as that term is defined by IC 13-11-2-160.

Total metals analysis. “Total metals analysis” means analysis of type III foundry sand using the latest edition of “Test Methods For Evaluating Solid Waste: Physical/Chemical Methods” EPA recommended analytical methods (SW-846, as amended) or other valid analytical methods deemed acceptable by IDEM.

Type III foundry sand. “Type III foundry sand” means foundry sand that has received a waste classification from IDEM of either type III or type IV criteria under 329 IAC 10-9.

Land Application

Type III foundry sand that satisfies IDEM’s ceiling concentration limits of metals of concern may be used in land application but it must be limited to annual and lifetime application rates (dry tons per acre). Type III foundry sand may only be used in land application if it has been demonstrated to not exceed ceiling concentration limits listed in 327 IAC 6.1-4-9(a). For convenience, those ceiling concentration limits are reprinted below as Table A.

To calculate the lifetime application rate, IDEM has developed a formula based on numerical toxicity factors for each of several metals of concern. These numerical toxicity factors are found in Table B of this document, below. To use this formula, a foundry or other person seeking to land apply type III foundry sand must perform a total metals analysis that obtains concentrations (mg/kg) of each metal of concern. A maximum application rate is generated for each metal by dividing the IDEM-supplied numerical toxicity factor by the foundry-supplied concentration (mg/kg) of the metal in the foundry sand. This quotient is the maximum application rate in dry tons of type III foundry sand per acre for that metal. The overall lifetime application rate is the smallest of the maximum application rates calculated for the metals of concern. Type III foundry sand may not be land applied in excess of this amount over the lifetime of the receiving site. The end user or landowner must be cautioned not to exceed the lifetime application rate.

In addition to the lifetime application rate, federal regulations concerning the use of materials containing cadmium limit the annual application rate of this metal. (See 40 CFR § 257.3-5). The annual numerical toxicity factor for cadmium is 223. Therefore, the maximum annual application rate, in dry tons per acre per year, is calculated by dividing the number 223 by the concentration of cadmium found in the total metals analysis. Type III foundry sand may not be land applied in excess of this amount in any year at the receiving site. The end user or landowner must be cautioned not to exceed this yearly application rate.

Soil Amendment

Type III foundry sand may also be used as a soil amendment if it is mixed with another product that is not a solid waste, hazardous waste, hazardous substance, or petroleum. Total metals analysis must be performed on either the type III foundry sand used as a soil amendment or on the product using type III foundry sand as a soil amendment. The total metals analysis of either the type III foundry sand or the product using type III foundry sand as a soil amendment must be demonstrated to not exceed soil amendment product concentration limits in Table C, below.

Additionally, federal regulations concerning the use of materials containing cadmium further limit the allowable concentration of cadmium in certain circumstances. (See 40 CFR § 257.3-5). If the cadmium concentration in the soil amendment exceeds 2 mg/kg on a dry weight basis, end users must be cautioned to adjust soil pH to 6.5 or higher when using the soil amendment for food crops.

Tables

TABLE A
Ceiling Concentration Limits for
Type III Foundry Sand to be Land Applied

Type III Foundry Sand <u>Metal of Concern</u>	<u>Land Application Ceiling Concentration Limit (mg/kg)</u>
arsenic	75
cadmium	85
chromium	3,000
copper	4,300
lead	840
mercury	57
molybdenum	75
nickel	420
selenium	100
zinc	7,500

TABLE B
Maximum Lifetime Land Application
Numerical Toxicity Factors and Formula

Type III Foundry Sand <u>Metal of Concern</u>	<u>Maximum Lifetime Land Application Numerical Toxicity Factor</u>
arsenic	18,500
cadmium	2,250*
chromium	1,338,500
copper	669,500
lead	134,000
mercury	7,500
nickel	187,500
selenium	44,500
zinc	1,249,500

*Please note the federally-imposed annual application limit for cadmium, described above in the “land application” section.

$$\text{Metal Specific Lifetime Application Rate } \left(\frac{\text{tons}}{\text{acre}} \right) = \frac{\text{Numerical Toxicity Factor}}{\text{Metal Concentration from Total Metals Analysis } \left(\frac{\text{mg}}{\text{kg}} \right)}$$

The lifetime application rate for the type III foundry sand is the smallest of the calculated metal specific lifetime application rates.

TABLE C
Soil Amendment Product Concentration Limits

Type III Foundry Sand <u>Metal of Concern</u>	Soil Amendment Product Concentration <u>Limit (mg/kg dry weight basis)</u>
arsenic	41
cadmium	39*
chromium	2000
copper	750
lead	300
mercury	17
molybdenum	75
nickel	210
selenium	100
zinc	1,400

*Please note the federally-imposed pH limit for soils to which cadmium-bearing material is applied, described above in the “soil amendment” section.

Other Conditions

No person may land apply type III foundry sand to any site if any of the cumulative pollutant loading rates in 327 IAC 6.1-4-9(b) have been reached or exceeded at that site through any land application operation, including but not limited to land application under this nonrule policy or 327 IAC 6.1. Foundry sand that was generated outside of Indiana that is land applied or used as a soil amendment must be in compliance with this nonrule policy.

Foundry sand must be stored and land applied in conformity with applicable laws, rules, and policies, including “Storage of Type III Foundry Sand Prior to Legitimate Use,” WASTE-0027-NPD (originally adopted April 9, 1998). Foundry sand may not be stored or land applied in a manner that would cause fugitive dust, fugitive particulate matter, or a violation of State or federal surface water or groundwater quality standards. Foundry sand that is land applied must be evenly applied on, or evenly incorporated into, the land. The Indiana Department of Natural Resources prohibits the unpermitted deposit of material in or on a floodway of certain rivers or streams. IC 14-28-1-22.

Foundry sand may not be stored or land applied within areas of Karst topography, in wetlands, in critical habits of endangered species, or in a floodway unless special arrangements are made to prevent environmental damage to these areas. Placement of type III foundry sand in accordance with the requirements set forth in 329 IAC 10-3-4(b)(1-4) will constitute compliance with this paragraph.

References

Powers and duties concerning solid and hazardous waste management: use of foundry sand that meets Type III criteria without permits, IC 13-19-3-7 (as amended by Senate Enrolled Act 495 (PL 30-1999) (effective July 1, 1999)).

Flood Control, IC 14-28-1.

Criteria for Classification of Solid Waste Disposal Facilities and Practices, 40 CFR Part 257.

Land Application of Biosolid, Industrial Waste Product, and Pollutant-Bearing Water, 327 IAC 6.1.

Solid Waste Land Disposal Facility Classification, 329 IAC 10-9.

Waste Determination, 329 IAC 10-7.1.

Fugitive Dust Emissions, 326 IAC 6-4.

Fugitive Particulate Matter Emission Limitations, 326 IAC 6-5.

Exclusions: disposal of wastes that meet restricted waste site Type IV criteria, 329 IAC 10-3-4.

“Test Methods For Evaluating Solid Waste: Physical/Chemical Methods” EPA Guidance Document, SW-846.

“Use of Foundry Sands in Accordance with House Enrolled Act 1541” nonrule policy document, WASTE-0028-NPD.

“Storage of Type III Foundry Sand Prior to Legitimate Use” nonrule policy document, WASTE-0027-NPD

“Solid Waste Program Analytical Data Deliverable Requirements: A Guidance Document” nonrule policy document, OSHWM General ID#0038-01-SW.