

Evaluating the Reuse Potential of Air Pollution Control Wastes

DNR Publication WA 1768

March 2015



This guidance is intended to assist both generators and reviewers in assessing the potential for recycling solid waste collected from air pollution control devices into productive, beneficial reuses. These waste materials are generated as fine mineral byproducts from the combustion of various fuels including coal or wood (fly ash only - bottom ash is not considered an air pollution control waste); the treatment or scrubbing of flue gases (flue gas desulfurization or similar condensate particulate matter); or the collection of fine particles from industrial processing (filterable particulate matter).

Air pollution control wastes may possess properties which would allow them to be beneficially used or disposed of outside of a licensed landfill. These uses or disposal options need to be approved through either a high-volume industrial waste recycling exemption approval under s. 289.43(7), Stats., as implemented through ch. NR 538 Wis. Adm. Code, or under a low hazard waste exemption (LHE) approval under s. 289.43(8), Stats.

Certain collected air pollution control wastes do not meet the requirements for the high volume industrial waste exemption approval under s. 289.43(7), Stats. These wastes do not meet the definition of “high-volume industrial waste” in s. 289.01(17), Stats., or the definition of “industrial byproducts” in ch. NR 538.03(4), Wis. Adm. Code. Wastes that do not meet the criteria to qualify for a high volume industrial byproduct may still be eligible for beneficial reuse under the low hazard waste exemption in s. 289.43(8), Stats.

This guidance describes the information needed to apply for a low hazard waste exemption for air pollution control wastes. Although this guidance focuses on air pollution control combustion and treatment wastes subject to federal Clean Air Act regulations, it can also be generally applied to other industrial solid wastes collected from air pollution control devices.

The DNR recognizes the benefits of, and encourages, re-using some categories of industrial generated wastes in order to preserve resources, conserve energy, and reduce or eliminate the need for disposal in landfills. Recycling certain industrial wastes can also replace virgin materials.

Evaluation Background

This section is intended to provide some important background information associated with the generation and handling of waste materials collected from air pollution control devices (e.g., electric static precipitators, particulate scrubbers, fabric filters). As new regulatory requirements and waste streams emerge, so does the need to provide guidance that supplements and complements the regulating and regulated parties approach to decision making.

High Volume Industrial Waste Exemption

Chapter NR 538, Wis. Adm. Code was established in 1997 as a result of section 289.05(4), Stats., which directed the Department of Natural Resources (DNR) to develop rules with standards for the beneficial reuse of high-volume industrial wastes. The goal of ch. NR 538, Wis. Adm. Code, is to encourage the beneficial

use of industrial byproducts in a nuisance-free and environmentally sound manner. This largely self-implementing rule establishes standards for five categories of specifically defined industrial byproducts, including: paper mill sludge, ash from energy recovery including coal ash and slag, material captured in flue gas desulfurization (FGD) systems, ferrous and steel foundry excess system sand and slag, lime kiln dust, and other non-hazardous solid waste with similar characteristics as determined by the DNR. To be eligible for beneficial use under ch. NR 538, Wis. Adm. Code, waste materials not otherwise specifically listed in s. NR 538.03(4), Wis. Adm. Code, must meet the following criteria:

- Be generated as a byproduct of an industrial process (cannot be post-consumer waste or the byproduct of combustion or processing of post-consumer waste);
- Possess consistent physical and chemical properties;
- Not require additional testing beyond the frequencies and substances in Appendix I of ch. NR 538 to verify its potential for appropriate uses;
- Be a good candidate for one of the beneficial uses in s. NR 538.10, Wis. Adm. Code, and not require additional conditions of approval for its use.

With respect to air pollution control wastes, ch. NR 538 authority may authorize the beneficial reuse of particulate and condensate fines collected in air pollution collection devices, so long as there is little or no additional conditioning, mixing or additives. Chapter NR 538 exemption authority may also apply to wastes from boilers and process heaters that fire relatively consistent solid fuels with no post-consumer supplemental fuels added or mixtures of fuel types. Other mixed waste materials that do not meet the definition of industrial byproducts are not eligible for the high volume industrial waste exemption, but these wastes may be conditionally approved for beneficial uses under the general low hazard waste exemption in s. 289.43(8), Stats.

Low Hazard Waste Exemption

Section 289.43(8), Stats., allows the department to

authorize the placement of specific wastes at a site other than a licensed solid waste landfill where regulation is not warranted due to a lack of hazard to public health or the environment. This provision has been used for a variety of non-hazardous wastes with physical and chemical characteristics that have been shown not to pose a significant threat to the environment or public health.

Federal Regulations on Disposal of Coal Combustion Residuals from Electric Utilities

On December 19, 2014, EPA finalized federal regulations on the disposal of coal combustion residuals (CCR) defining them as a solid waste subject to 40 CFR Part 257, Subtitle D of the Resource Conservation and Recovery Act (RCRA). The federal regulations are self-implementing. To meet the federal definition of “beneficial use” a generator must demonstrate: (1) the CCR provides a functional benefit; (2) the CCR substitutes for the use of a virgin material, conserving natural resources that would otherwise be needed; (3) the use of CCR meets relevant product specifications, regulatory standards, and design specifications and if such standards are not available must not be used in excess quantities; and (4) the unencapsulated use of 12,400 tons or more of CCR placed on the land in non-roadway applications meets certain environmental protection criteria. Sand and gravel pits and quarries that receive CCR are defined as landfills and will not qualify as a beneficial use under the federal regulations.

Federal Clean Air Act Regulations

On March 21, 2011, EPA promulgated in the Federal Register the Title 40 CFR Part 63 Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters, otherwise known as Boiler MACT and a companion standard, known as the Boiler GACT (40 CFR Part 63 Subpart JJJJJ), for minor industrial, commercial, and institutional boilers area emission sources. The purpose of these rules was to establish national emission limitations and work practice standards for hazardous

air pollutants (HAP) emitted from industrial, commercial, and institutional boilers and process heaters, with compliance no later than January 31, 2016.

Due to the required reduction in emitted air pollutants, facilities with boilers and process heaters are installing additional air pollution control measures. These measures include, but are not limited to: additional dry and/or wet control devices and/or units that inject additives. As a result, a wide variety of new types of air pollution control wastes and mixtures are being generated that must either find recycling options or be properly disposed.

Low Hazard Exemption Requirements

Waste collected from combustion and process heating units that do not meet the criteria to be defined as an industrial byproduct under s. NR 538.03(4), Wis. Adm. Code can still apply for approval for beneficial reuse under s. 289.43(8), Stats. for a low hazard waste exemption. To qualify for a low hazard waste exemption, the proposed use must meet the definition of “recycling” in s. 289.43(1), Stats. Recycling is defined as the process by which a solid waste is returned to a productive use. For the purposes of this guidance, this means the solid waste generator must demonstrate that the waste material will perform in a manner comparable to virgin materials used for the same purpose and can meet standard specifications for the proposed use.

Waste Characterization

The DNR Publication WA-1645 “Exempting Low-Hazard Wastes from Solid Waste Regulations”, outlines the general low hazard exemption approval process. In addition to the requirements in this guidance, persons proposing to recycle air pollution control wastes must also submit the following:

- An appropriate testing program to characterize the waste materials. The testing program must include all potential contaminants including the full range of metals, salt content (chloride, sulfate and

fluoride), nitrates, and pH. Testing must address both leaching potential and total elemental analysis. Once an air pollution control waste has been adequately characterized and verified as not meeting the definition of a hazardous waste under s. NR 660.10(52) Wis. Adm. Code, it can be considered for recycling or beneficial use applications. The successful management of the material requires a thorough understanding of its chemical, physical, and engineering properties to assure that its use does not pose a potential hazard to public health or the environment. The generator must demonstrate that the material being generated can, under defined conditions, be legitimately recycled for a beneficial use.

- A detailed description of the process that generates the air pollution control wastes. The description must include details of any non-combustible material within the waste, and any material or compounds added during the pollution control process such as lime, activated carbon, ammonia or bromides. A brief description of how each of these additives is used, where they are introduced into the pollution control process and their purpose must also be included. An estimate of the amount or percentage of each of these materials or compounds as part of the final waste material must be included. If the resulting waste is a mixture of different materials, the percentage of each material and their properties must be included, along with a brief description of how and where in the process this mixing occurs. Once the air pollution control wastes have been generated, any treatment to further react or stabilize the material must also be described. This includes:
 - ✓ Hydration: The amount, liquid source, and method of hydration should be detailed in the initial characterization.
 - ✓ Curing: If the wastes are to be left for a period of time to react or cure, the generator should describe the anticipated curing time, method and location of the process.
 - ✓ Additives: If additional compounds are to be added to the wastes after they have been generated to enhance the stabilization of the

material, both the quantities and specifications of the materials to be added must be included in the initial characterization.

Recycling Options

If testing confirms that the air pollution control wastes are non-hazardous but have the potential to cause detrimental effects to water quality, opportunities for recycling or beneficial use may be limited to the following:

1. Manufacturing of a product in which the measurable leaching, emissions or decomposition characteristics 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. As an agent 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. Approval is subject to any conditions imposed by the assigned DNR engineer and the landfill's plan of operation.
3. A supplemental fuel that provides energy through controlled burning.
4. Daily cover or internal structures at lined landfills having a leachate collection system. If the collected material is to be used as an alternate daily cover at a landfill, it may not contain more than 15% silt and clay sized materials (P200 content), and may not be placed in layers greater than 6 inches thick unless otherwise approved by the DNR. Approval is subject to any conditions imposed by the assigned DNR engineer and the landfill's plan of operation.
5. Collected material for the use as confined geotechnical fill.
 - a) The generator must demonstrate through waste characterization protocols that the air pollution control wastes can adequately perform as geotechnical fill and can legitimately be used as a replacement for virgin materials. To demonstrate this, the generator must perform a series of material properties tests in accordance with ASTM standards such as grain size, optimum moisture content, unconfined compression strength, linear dimensional stability, and permeability. Other tests may be needed depending on the specifications required for the particular fill application.
 - b) The generator must develop a set of standard construction protocols and specifications for use of the material in geotechnical fill applications based on the testing results. These specifications must include any required testing to be performed on the material prior to use (e.g., ASTM E1861, *Standard Guide for Use of Coal Combustion Byproducts in Structural Fills*, or WDOT Highway Construction Specifications) and the acceptable range for the test results. The specifications must include sections describing how the material should be treated and placed at the site (as well as any limitations on use or placement) and sections on transporting and compacting the material. These specifications must be part of the submittal to the department so they can be reviewed and referenced in the final approval.
 - c) If it is established that the waste material can be used as an acceptable fill replacement, geotechnical fill approvals can be issued on a site- or project-specific basis. Conditions of use include a prohibition on the use in residential areas or under residential buildings, no placement of material more than 4 feet beyond the edge of the confining cover, no placement of more than 3000 cubic yards per half acre, and no placement more than 4 feet deep under paved lots. All projects must also conform to standard construction industry best

management practices. Due to a potential for causing groundwater quality standard exceedances, fill projects may be required to install some system for groundwater monitoring including wells or lysimeters.

Agricultural Soil Amendments

Certain air pollution control wastes or byproducts may be suitable for use as agricultural soil amendments. In addition to the previously mentioned waste characterization, generators must also provide the following information if the material is intended for use as an agricultural soil amendment:

- a) Demonstrate that the material has value as a soil conditioner or fertilizer. To accomplish this, the generator may conduct greenhouse or experimental field studies in addition to citing relevant federal regulations, technical guidelines or academic research. New land application research projects are exempt from landspreading regulations if approved under s. NR 518.04(2), Wis. Adm. Code, as long as they meet the exemption conditions. Testing should be conducted over a length of time and at a frequency adequate to demonstrate the potential variability of the waste material over time.
- b) Demonstrate that the air pollution control wastes or byproducts will not be applied such that excessive accumulation of hazardous substances occurs in soil or vegetation, or the wastes or byproducts cause a detrimental effect on surface or ground water quality. Generators must submit a range of proposed application rates, the proposed method for incorporating the material and the recommended timing between applications. These rates must be based on previous testing results and accepted agricultural practices. The generator or applicator will be required to furnish a

written copy of these recommendations to every end user.

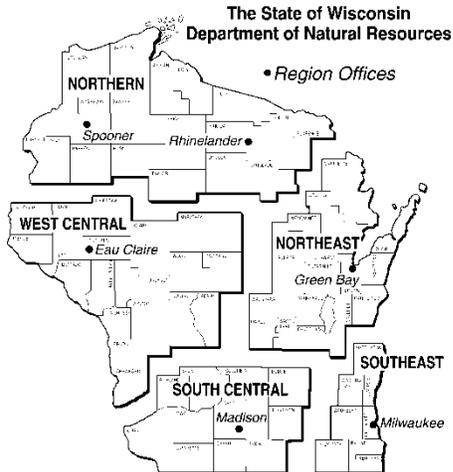
- c) A license by the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) for the sale and marketing of the material for its intended agriculture, soil conditioner or fertilizer use (e.g., liming agent, sulfur additive).

Recycling versus Disposal

A low hazard exemption may not be approved for wastes and uses that require the types of conditions typically required for landfills under ch. 289 and the solid waste regulations. While some conditions may be placed on a low hazard waste approval, if the placement of air pollution control waste fill material requires engineering controls such as the use of liners, leachate collection systems and engineered caps, and/or requires long-term care to prevent adverse environmental impacts, the use will not be considered to be the recycling of a low-hazard waste material eligible for an exemption from landfill disposal. Waste placed in this manner will be considered a landfill in accordance with the definition in s. NR 500.03(120), Wis. Adm. Code.

Landfill Disposal

Special care should be taken when considering disposal of air pollution control wastes in landfills that also accept municipal solid waste. Some air pollution control wastes possess properties that could make them incompatible with municipal solid waste landfill operations, especially if they exceed 5 percent of the waste volume. Potential adverse effects must be evaluated by the assigned DNR engineer in accordance with s. NR 506.09 Wis. Adm. Code and incorporated into an approved special waste acceptance plan before any air pollution control wastes can be accepted for disposal or alternate daily cover at engineered municipal solid waste landfills.



Requests should be made to the Regional Waste and Materials Management Program Manager.

- Northeast Region
2984 Shawano Ave.
Green Bay WI 54313-6727
920/662-5431 - Waste Program Manager
- Northern Region
*East ½ call Northeast Region
West ½ call West Central Region*
- South Central Region
3911 Fish Hatchery Road
Fitchburg, WI 53711
608/275-3466 - Waste Program Manager
- Southeast Region
2300 N. Martin Luther King Jr. Drive
Milwaukee, WI 53212
414/263-8694 - Waste Program Manager
- West Central Region
1300 W. Clairemont Ave.
Eau Claire, WI 54702
715/839-2788 - Waste Program Manager

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