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Beneficial Use of Coal Combustion By-Products, Steel Manufacturing By-Products, and Other Similar Materials

The Nebraska Department of Environment and Energy (NDEE) receives, on a regular basis, requests from businesses and industry to determine if a particular waste is or can be classified as a "beneficial use" material. Specifically, the Department has received inquiries regarding the suitability of beneficial uses of coal combustion by-products (fly ash and bottom ash/boiler slag), steel manufacturing by-products, and other similar wastes.

[Title 132 - Integrated Solid Waste Management Regulations](#) require that solid waste be disposed at a permitted solid waste management facility. Chapter 2, §002 of Title 132 allows exceptions to this requirement provided the materials used are not mixed with other solid wastes and do not as a result of handling or disposal have the potential to cause contamination that may threaten human health or the environment. If a material is characterized as a hazardous waste, it cannot be used for these beneficial use purposes.

The Department has developed the following guidance with respect to the beneficial use of coal combustion by-products, steel manufacturing by-products and other similar materials. The beneficial uses identified below, are based upon the Department's determining there is no apparent threat to human health or the environment from the use of these materials. The Department's review and determination does not include an evaluation of the engineering properties of these materials. Any determination regarding the ability of these materials to meet specific design criteria applications must be made by a qualified professional.

COAL COMBUSTION BY-PRODUCTS

The following legitimate uses of coal combustion by-products are not regulated under Title 132 and therefore, do not require prior review from the NDEE Waste Management Division. Coal combustion by-products used for these processes must meet the exemption requirements of [Title 128 - Nebraska Hazardous Waste Regulations](#), Chapter 2, §009.03.

1. *Construction or manufacture of products.* Examples would be mixing concrete with fly ash or using fly ash or another similar material as an aggregate in concrete or asphalt for the construction or manufacture of roads, poles, block, etc.
2. *Hazardous waste stabilization.* Owners or operators of all facilities which use coal-combustion by-products for hazardous waste stabilization must comply with [Title 128 - Nebraska Hazardous Waste Regulations](#), Chapter 20, Land Disposal Restrictions.

3. *Ice control.* This applies specifically to ice control applications (ice jams) in rivers. A permit under the National Pollutant Discharge Elimination System (NPDES) must be obtained from the Department prior to initiating this activity.
4. *Stabilizing agents and soil modification,* such as base/subbase/subgrade under concrete, asphalt, armor coat, sand-gravel/limestone surfaces and roads, parking lots, or building sites.
5. *Aggregate for roads,* such as use of bottom ash for armor coat and chip seal aggregate.
6. *Structural fill.* This may include the use of bottom ash and/or fly ash mixed with soil for backfill of utility trenches and behind foundation walls, buildup of grade or as an embankment for roadways/overpasses.
7. *Controlled density/slurry fill,* as used for the closure of pipelines, tanks, sewers, and other similar structures.
8. *Soil amendment.* This refers specifically to the land application of fly ash to neutralize soil acidity. The fly ash should have a calcium carbonate equivalence of at least 20%. The fly ash application rate should be based upon the neutralizing capacity of the fly ash used and the amount of fly ash required to raise the soil pH to an optimum level (pH 6.5 to 7.0). The application rate should not exceed 10 tons per acre in any single annual application.
9. *Feedlot applications.* Coal combustion by-products may be used for feedlot applications such as construction and maintenance of feedlot lanes and pens provided steps are taken to insure that surface and ground water will not be impacted. The fly ash must be mixed with soil to prevent surface run off and wind erosion of the fly ash. Bottom ash may be surface spread as an aggregate on feedlot lanes.

STEEL MANUFACTURING BY-PRODUCTS

The following legitimate uses of steel manufacturing by-products, such as slag, spent refractory, and scale are not regulated under Title 132 and therefore do not require prior approval from the NDEE Waste Management Division. Steel manufacturing by-products used for these processes must meet the exemption requirements of [Title 128 - Nebraska Hazardous Waste Regulations](#), Chapter 2, §009.03.

1. *Construction or manufacture of products.* Examples would be mixing concrete with steel manufacturing by-products, or using steel manufacturing by-products as an aggregate in concrete or asphalt for the construction or manufacture of roads, poles, block, etc.
2. *Stabilizing agents and soil modification,* such as base/subbase/subgrade under concrete, asphalt, armor coat, sand-gravel/limestone surfaces and roads, parking lots, or building sites.
3. *Aggregate for roads,* such as armor coat, chip seal aggregate and loose aggregate.
4. *Anti-skid* (snow and ice) control aggregate on roadways.
5. *Railroad ballast* to prevent erosion and stabilize/fix ties in railroad beds.

EVALUATION PROCESS FOR OTHER USES OF THESE AND OTHER SIMILAR MATERIALS

The use of coal combustion by-products, steel manufacturing by-products and other similar materials

for purposes other than those described above will be reviewed by the Department on a case-by-case basis. The Department encourages individuals or facilities to explore beneficial uses for the management of wastes. The legitimate reuse or recycling of a waste or material is a viable and recommended means of managing waste provided the ultimate end use of the material does not constitute disposal.

The following criteria will be used by the Department on a case-by-case basis to review use requests.

1. *Does the material exhibit regulated hazardous waste characteristics?*
If so, it cannot be used as a beneficial use material, and must be handled according to applicable regulations in Title 132 and [Title 128 - Nebraska Hazardous Waste Regulations](#).
2. *Is the material contaminated with other wastes?*
The Department considers a material to be contaminated if it contains waste materials in concentrations that threaten human health or the environment.
3. *Does the material pose a potential threat to human health or the environment?*
In making this evaluation, several factors will be considered including, but not limited to:
 - a. Types of potential contaminants that may be present and any special handling requirements, health concerns or warnings, or environmental impacts associated with the material as identified in published data, Material Safety Data Sheets (MSDS) or past analytical data.
 - b. Analytical data, which would determine the type and concentration of any potential contaminants present. Test methods to evaluate this criteria could include: total metals, volatile organic compounds (VOCs), semi-volatiles, pesticides, polychlorinated biphenyls (PCBs), petroleum hydrocarbons, or any other test method deemed necessary to characterize the waste stream.
 - c. Leachability fate and transport characteristics of the material in question. Test methods to evaluate these criteria could include, but not be limited to, American Society of Testing Materials (ASTM) Test Number D3987-85 (water leach test) and/or the Toxicity Characteristic Leaching Procedure (TCLP) in compliance with EPA SW-846 Methods, dependent upon the constituent of concern. In the case of materials or wastes that will be "fixed" or "treated" prior to use, the testing should be done after the material is fixed or treated. The terms "fixed" and "treated" imply that the waste is processed in some manner to reduce or eliminate the constituent of concern or its potential to threaten human health or the environment.

Note: Information collected can be from recent sampling or historical data, but it must be representative of the material or constituent in question. In evaluating whether the material poses a potential threat to human health or the environment, the constituents to be released to the environment will be compared to the numerical standards of the maximum concentration levels (MCLs) as identified in Department regulations, including but not limited to, [Title 117 - Nebraska Surface Water Quality Standards](#) and [Title 118 - Ground Water Quality Standards and Use Classification](#). The data may also be compared to EPA Region 9 Preliminary Remediation Goals to evaluate whether the material poses a potential threat to human health or the environment through other exposure pathways besides ground water and surface water.

4. *What are the site-specific conditions?*

Provide data, which adequately describes the geologic and hydrogeologic conditions of the beneficial use area. Also, provide a description of the proposed use of the material at the site and whether any engineering design features will be used.

5. *Does the end use of the material constitute disposal?*

For those materials in which it has been demonstrated that the constituents of concern have been identified and analyzed and are below established MCLs, maximum contaminate level goals, or other recognized published data, the Department will evaluate the acceptability of the proposed use of the material in light of those applications in which the ultimate end use may constitute disposal. The use of the material must serve a bonafide function and exhibit performance qualities similar to commercial or natural products commonly used for the same functions.

RESOURCES:

- NDEE Home Page <http://dee.ne.gov/>

Contacts:

- NDEE Waste Management Section (402) 471-4210
- NDEE Toll Free Number (877) 253-2603
- NDEE Hazardous Waste Compliance Assistant (402) 471-8308
- Email questions to: NDEE.moreinfo@nebraska.gov

NDEE Publications:

- [Title 117 - Nebraska Surface Water Quality Standards](#)
 - [Title 118 - Ground Water Quality Standards and Use Classification](#)
 - [Title 128 – Nebraska Hazardous Waste Regulations](#)
 - [Title 132 – Integrated Solid Waste Management Regulations](#)
- Titles are available on the NDEE Home Page under “Laws/Regs & EQC”, “Rules & Regulations”*

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