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PERMITTING AND COMPLIANCE DIVISION  
WASTE AND UNDERGROUND TANK MANAGEMENT BUREAU  
SOLID WASTE PROGRAM  
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**GUIDE TO BENEFICIAL USE DETERMINATIONS OF WASTE INDUSTRIAL AND  
MANUFACTURING BY-PRODUCTS**

**INTRODUCTION**

This document is provided as guidance in the determination of beneficial uses for waste industrial and manufacturing by-products otherwise destined for disposal. The 2006 Montana Integrated Waste Management Plan declares “The State of Montana will steadily reduce the amount of non-hazardous industrial waste that is disposed of by landfilling or incineration.” The Department of Environmental Quality (Department) recognizes that diverting non-hazardous industrial and manufacturing by-products for recycling saves disposal costs for the generator, decreases material costs for end users, and preserves natural resources by decreasing the demand for virgin materials. In addition, the Department encourages the beneficial use of industrial by-products to protect the environment, preserve resources, conserve energy, reduce greenhouse gases, and reduce or eliminate the need to otherwise dispose of these materials in licensed landfills.

Unless these non-hazardous waste industrial or manufacturing by-products are used in an approved beneficial manner, they are to be managed as a solid waste. This guidance does not apply to the use of listed or characteristic hazardous waste or metallic mining waste. In addition, the land application of wastewater treatment wastes are not covered by this guidance.

The Administrative Rules of Montana (ARM) 17.50.502(54) define a waste as follows:

*“Waste” means useless, unwanted, or discarded materials in any physical form, i.e., solid, semi-solid, liquid, or gaseous. The term is not intended to apply to by-products or materials which have economic value and may be used by the person producing the material or sold to another person for resource recovery or use in a beneficial manner.*

Further, Webster’s defines a by-product as follows:

*“By-product” any material contingent upon or incidental to a manufacturing process.*

In accordance with this definition, by-products are materials that are produced during the manufacturing of some other product. For example, bagasse is a by-product in the manufacturing of sugar from sugar cane. Bagasse is used for paper production and as biomass for the production of energy. As long as the person producing the bagasse is reusing the material, this by-product is not considered a waste. However, if that material is used by another person for use in a beneficial manner, the user must first demonstrate the proposed use is beneficial. This is done by means of a demonstration petition submitted to the Department for review. The material may not be used in the proposed manner until the Department approves the demonstration.

## **BUD PROCESS**

Pursuant to ARM 17.50.508, prior to managing solid waste, a person shall obtain a solid waste management system license. A Beneficial Use Determination (BUD) is a determination that an industrial or manufacturing by-product material, otherwise destined for disposal, will be used in a specific and beneficial manner. In an effort to encourage diversion from the solid waste stream, the Department's approval of the BUD exempts the individual proposing to use this material from obtaining a solid waste management system license for the specific use identified. As long as the material is used in compliance with the approved BUD, there is no requirement for a solid waste license. The Department has the authority to modify, terminate or rescind any BUD approval. Further, although a successful BUD exempts an individual from licensure, the Department requires the submittal of an annual report documenting its use in the approved manner.

### BUD Eligibility

The Department encourages industry to review the by-product materials generated through manufacturing processes and seek BUD review for those non-hazardous by-products that can be diverted to productive use.

To be eligible for beneficial use, an industrial or manufacturing by-product material must be used in the form in which it is generated. Industrial or manufacturing by-product materials that require treatment or reprocessing before reuse are not eligible for BUD review. This treatment or reprocessing activity before reuse is considered resource recovery. Resource recovery systems are subject to licensure in accordance with current solid waste laws and rules.

The Department will determine in writing within 90-days of receipt of a complete application, on a case-by-case basis, whether the proposed use constitutes a beneficial use. The criteria used by the Department when evaluating BUDs are that the product and proposed end use must:

- Be protective of human health and the environment
- Constitute a use rather than a disposal
- Be consistent with the Integrated Waste Management Plan

- Provide an effective substitute for an analogous raw material or an effective substitute for a commercial product
- Not require decontamination or treatment
- Have a demonstrated, sustainable market and need for the material
- Divert waste from a landfill or other disposal facility
- Save resources or energy
- Meet target contaminant levels
- Be used in a product or activity where contaminants are chemically bound

### Application Required

The Department's approval of the BUD request is based on the application and supplemental information provided by the individual(s) proposing the beneficial use of the by-product. BUD's are approved on a case-by-case basis based upon the nature, quantity, and end use of the material, the existence of sustainable market(s), as well as the impact to the environment of the proposed beneficial use area. Further, until the individual requesting the BUD demonstrates that the evaluation criteria will be met, that the material may be used beneficially in a specific and sufficient manner, and that the designated use remains protective of human health and the environment, the material remains a solid waste. Appendix A contains the BUD application.

The applicant must provide the following information to the Department in the BUD petition:

- A description of the by-product material subject to the application and its proposed use
- A brief description of the benefits realized: landfill space saved, resources saved, costs saved, energy saved, and more
- A description of the management procedures for the by-product material prior to use
- A description of how the by-product material will be used
- Chemical and physical characteristics of the by-product material
- Chemical and physical characteristics of the end product
- A demonstration of market sustainability for the by-product material and end product
- A demonstration that the by-product material complies with industry standards and specifications for the analogous virgin or commercial material/ingredient
- A demonstration that the management of the by-product material will not adversely affect human health and safety, the environment, or natural resources by providing a materials control plan that describes:
  - The source of the by-product material under review
  - The procedures for periodic testing of the by-product material to ensure that the composition has not changed significantly
  - The disposition of any solid waste resulting from the proposed end use
  - A description of the type of storage and the maximum inventory
  - Procedures for run-on and run-off control of the storage areas

- A program and implementation schedule of the best management practices designed to minimize the uncontrolled dispersion of the by-product material before and during all aspects of its storage and inventory and/or during beneficial use (SPCC)
- A contingency plan that includes all relevant emergency management procedures, availability of emergency services, evacuation plan, and emergency coordinator information

The Department may revoke an approved BUD if:

- It finds that one or more of the items of information submitted serving as the basis for the Department's approval was incorrect or is no longer valid
- It finds there has been a violation of any condition
- It finds that the use, reuse or reclamation process has become a public nuisance

Finally, successful BUD demonstrations will exempt the by-product material from regulation as a solid waste for the intended use from the identified source for the applicant. Demonstrations for the use of like materials from other sources will be considered separately.

#### Performance Standards

When considering the storage, handling, processing, or beneficial use of industrial byproducts, it is important to adequately protect the surrounding environment and minimize exposure to workers. Uses that cause significant impacts to wetlands, critical habitat areas, surface water or groundwater are prohibited. The BUD application must include the requirements for storage and the identification of operational process and product quality controls to ensure the use of the byproduct does not negatively impact human health or the environment.

Factors used by the Department to evaluate the general restrictions or specific conditions for each BUD include, but are not limited to, the following:

- Site location;
- Set-back requirements from water supplies, surface water, and/or wetlands;
- Depth to groundwater;
- Regular reporting of waste quantities used;
- Environmental benefits realized;
- Periodic follow-up testing of end-use product;
- Volume restrictions; and,
- Regular monitoring reports (pre- and/or post-use).

#### Risk Assessment

Using risk assessments for human or ecological receptors is an important part of beneficial use determinations. Therefore, risk-based evaluations may be required in a BUD. The risk evaluation process will be determined and approved by the Department on a case-by-case basis.

### Annual reporting requirements

The Department requires the submittal of an annual report to the Solid Waste Program, by April 1 of each year, on a form provided by the Department that includes the following information:

- Volume/tonnage of by-product material used
- Specific use(s) of the by-product material
- Use location(s), i.e., address or legal location
- Testing results of by-product material and end product, as applicable
- Disposition of solid waste resulting from the approved end use

### **INDUSTRIAL BY-PRODUCTS CURRENTLY ELIGIBLE FOR BUD APPLICATION**

Coal Combustion Residue means ash from coal-fired energy production including coal ash and slag, material captured in flue gas desulfurization (FGD) systems, lime kiln dust or select other non-hazardous solid waste with similar characteristics as determined by the Department. This includes FGD wastes that are recovered from air pollution control systems that capture sulfur dioxide emissions from coal-fired energy production facilities.

Lime kiln dust means the material recovered from air pollution control systems that capture emissions from lime kilns.

For the purpose of this guidance, other industrial by-products not specifically identified above are those products generated from a manufacturing or other industrial process that otherwise destined for disposal. The beneficial use of other byproducts or wastes not identified herein must be reviewed and approved on a case-by-case basis.

## THE BUD CHARACTERIZATION STRATEGY

### 1. *Analyze and Characterize the Target Materials:*

INITIAL CHARACTERIZATION: A representative sample of the by-product material must be properly analyzed to determine its physical and chemical characteristics. The testing requirements may vary depending upon the material and the proposed end use. Therefore, the Department must first be consulted to determine the analytical requirements and necessary sampling protocols.

Examples of analytical requirements include total metals, volatile and/or semi-volatile organics, dioxins and furans, cyanides, sulfates, chlorides, polychlorinated biphenyls, nitrates/nitrites, leaching procedures including EPA Method 1311 (Toxicity Characteristic Leaching Procedure or TCLP), EPA Method 1312 (Synthetic Precipitation Leaching Procedure or SPLP), or neutral water leaching procedure (ASTM Method D3987-06). Laboratory testing of the physical properties must follow specific standards (eg., ASTM) appropriate to the proposed beneficial use.

RE-CHARACTERIZATION: A representative sample of the byproduct material must be reanalyzed whenever there is a change in the process producing the industrial byproduct that could result in a change of the characteristics of that byproduct material. Once again, the Department must be consulted to determine the analytical requirements, lab tests, and necessary sampling protocols.

### 2. *Identify Environmentally Safe Beneficial Uses:*

BENEFICIAL USES: To ensure that the proposed beneficial use of the waste materials or industrial byproducts protects human health and the environment, the proposed end use must be identified. In addition, the applicant must demonstrate that (i) the emission, leaching, and decomposition characteristics of the waste are substantially eliminated for the proposed use, (ii) a sustainable market exists, and (iii) the waste material constitutes an effective and stable substitute for an analogous material based upon its physical and chemical characteristics.

The following examples provide several possible beneficial uses of industrial byproducts:

- i. Substitution for 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;
  - ii. Agents for physical or chemical stabilization, solidification or other treatment of solid waste that is to be otherwise disposed of at a lined landfill having a leachate collection system, or utilized in some other final use approved by the department;
  - iii. Supplemental fuels that provide energy through controlled burning;
  - iv. Daily or intermediate cover at lined landfills having a leachate collection system;
- or

- v. Confined geotechnical fill material such as:
  - (a) base course, sub-base or sub-grade fill for the construction of commercial, industrial or non-residential institutional buildings;
  - (b) base course, sub-base or sub-grade fill for the construction of a portland cement concrete or asphaltic concrete paved lot;
  - (c) base course, sub-base or sub-grade fill for the construction of a paved federal, state or municipal roadway;
  - (d) utility trench backfill or bedding;
  - (f) abandonment of tanks, vaults or tunnels that will provide total encapsulation of the industrial byproduct; or,
  - (g) soil and pavement stabilization.



## SECTION 2: Generator Information

<input type="checkbox"/> Applicant is Generator  Generator/Company Name:  Federal Tax ID No.:	Name of Responsible Official in Company:  Position/Title:
Generator Mailing Address:  Street:  City:  State:            Zip:	Generator Phone:  FAX:  Email:

## SECTION 3: Details of Proposed Beneficial Use(s) Information to be provided – include as separate attachment

The following information must be provided for the Department's evaluation of the proposal:

- A description of the material subject to the application and its proposed use, including (i) the process that produces the material, (ii) the source/generator of the by-product material, (iii) the chemical and physical characteristics of the by-product material, and (iv) the chemical and physical characteristics of the end use product
- A description of the management procedures for the by-product material prior to use, including (i) a complete description of how the by-product material will be transported from the point of generation to the location of the proposed beneficial use, (ii) a complete description of any offsite intermediate storage location, (iii) a description of the method(s) and duration of storage at the point of use and any intermediate storage location (including any run-on/run-off controls)
- A description of how the by-product material will be used in or to produce the end product
- Provide an estimate of the volume or tonnage to be used annually
- A demonstration of market sustainability for the by-product material and end product
- A demonstration that the by-product material complies with industry standards and specifications for that material
- A demonstration that the management of the by-product material will not adversely affect human health and safety, the environment, or natural resources by providing a materials control plan that describes:
  - The procedures for periodic testing of the by-product material to ensure that the composition has not changed significantly
  - The requirements for testing when the process producing the end product is modified
  - The disposition of any solid waste resulting from the proposed end use
- A contingency plan that includes all relevant emergency management procedures, availability of emergency services, agreements by local emergency agencies to provide emergency services, evacuation plan, and emergency coordinator information

Mail completed applications to:

**Montana Department of Environmental Quality**  
**WUTMB-SWP**  
**PO Box 200901**  
**Helena, MT 59620-0901**