



Foundry Sand Reuse in Montana

Best Practices & Regulatory Compliance

Abrasive Removal Services (ARS)

Kelley, Iowa

Phone: (515) 720-7081 | Email: team@abrasiveremovalservices.com

Table of Contents

1. Montana - Foundry Sand Recycling and Reuse (Cover)
2. Table of Contents
3. Key Concepts and Definitions
4. Regulatory Guidelines
5. Reuse Applications and Montana Examples
6. Environmental and Technical Considerations
7. Funding, Grants, and Incentives
8. Active Participants in Montana
9. Success Story Highlights
10. Clear Business Case Summary
11. Risk Management Overview
12. Step-by-Step Workflow for Foundries
13. Real Cost Savings Example
15. General FAQ & Landfill-Specific FAQ
16. References

3. Key Concepts and Definitions

What is Foundry Sand?

Foundry sand is high-purity silica sand used in metal casting to create precise molds for Montana's diverse industrial base, including mining, locomotive, and agricultural equipment manufacturing. Once the sand can no longer be used for casting—due to binder saturation or thermal fatigue—it is removed as **spent foundry sand (SFS)**. In Montana, this material is typically non-hazardous and is categorized as an industrial byproduct with high structural value for civil engineering.

What is Beneficial Reuse?

In Montana, beneficial reuse is a formal determination by the DEQ that a non-hazardous industrial or manufacturing byproduct can be used in a specific and beneficial manner, exempting the user from needing a formal solid waste management system license for that specific application.

What is the TCLP Test?

The **Toxicity Characteristic Leaching Procedure (TCLP)** (EPA Method 1311) is the core test used to verify that spent sand is not a hazardous waste. In Montana, passing TCLP is the first requirement to qualify for the Beneficial Use Determination (BUD) process, ensuring that the material does not pose a risk to the state's sensitive surface and groundwater.

4. Regulatory Guidelines

Montana Department of Environmental Quality (DEQ)

The **Montana DEQ**, specifically the Solid Waste Program, oversees the beneficial reuse of industrial materials through its permitting and licensure framework.

Specific Legal Citations:

- **Administrative Rules of Montana (ARM) 17.50.401:** Provides the foundational authority for solid waste management and licensing.
- **BUD Process (Montana DEQ):** A Beneficial Use Determination (BUD) is a formal process where the DEQ evaluates the environmental and technical suitability of a proposed reuse.
- **ARM 17.50.501:** Outlines the licensing requirements for solid waste management systems, from which approved BUD projects are specifically exempted.

The BUD Application

To secure a BUD in Montana, an applicant must demonstrate that the material is an effective and stable substitute for a virgin material and that its emission, leaching, and decomposition characteristics are substantially eliminated for the proposed use.

5. Reuse Applications and Montana Examples

Application	Description	Montana Context
Road Sub-base	Foundation layer for road beds.	High potential in MDT (Montana DOT) infrastructure and mining haul roads.
Landfill Daily Cover	Alternative Daily Cover (ADC).	Viable at the Billings and Lewis and Clark County landfills.
Asphalt Aggregate	Partial replacement of fine aggregate.	Applicable for use at regional hot-mix asphalt plants in the Missoula/Helena corridor.
Structural Fill	Bedding for building pads or embankments.	Subject to site-specific BUD and worker exposure screening.
Concrete Additive	Silica source or fine aggregate.	Used in local concrete manufacturing for industrial components.

6. Environmental and Technical Considerations

Protection of Vital Water Resources

Montana DEQ prohibits beneficial reuse in a manner that impacts **wetlands, critical habitats, or surface waters**. Given the state's reliance on pristine aquatic systems for

agriculture and tourism, leaching characterization is a high-priority component of any BUD application.

Physical Stability

SFS from Montana's industrial foundries often exhibits superior uniformity and compaction compared to naturally occurring bank-run sand, making it a high-performance material for highway embankment stabilization in freeze-thaw zones.

7. Funding, Grants, and Incentives

DEQ Recycling and Waste Diversion Support

The Montana DEQ occasionally offers funding to support projects that reduce the state's landfill burden through competitive waste diversion grants. Foundries partnering with local municipalities to create "Recycled Aggregate Hubs" may be eligible for technical and financial support.

Montana Department of Commerce

The state offers various tax incentives for "Value-Added Manufacturing." Foundries that process their byproducts into a marketable, certified aggregate can apply for these credits, which support the purchase of specialized screening and reclamation equipment.

8. Active Participants in Montana

Major Foundries and Hubs:

- **AFFCO (Anaconda Foundry Fabrication Company)** (Anaconda) - Largest metal recycler in MT; Iron and Aluminum sandcastings.
- **Billings Bronze Inc.** (Billings) - Specialty fine art bronze casting.

- **Vinnetti's Bronze Foundry** (Missoula) - Fine art casting and monuments.
- **1964 Makers** (Helena) - Custom metal art, fabrication, and foundry work.
- **Midland West Manufacturing** (Billings) - Industrial fabrication involving metal components.

Potential End-Users:

- **MDT (Montana Dept. of Transportation)** - Major aggregate consumer for state highway projects.
- **Fisher Sand & Gravel Co.** (Regional) - Large-scale civil contractor and aggregate producer.
- **Knife River Corporation** (Regional) - Major asphalt and concrete producer.
- **Lewis and Clark County Solid Waste** - User of Alternative Daily Cover (ADC).

9. Success Story Highlights

Anaconda Industrial Loop: Industrial recyclers in the Anaconda-Butte corridor, such as **AFFCO (Anaconda Foundry Fabrication Company)**, have implemented high-efficiency sand reclamation systems as part of their status as a major regional metal recycler. By transitioning the final spent fines into regional landfill daily cover and local mining road-base projects, these facilities avoid the gate fees at regional Subtitle D landfills (which can reach **\$56.75 per ton**) and provide a stable, low-cost aggregate source for Western Montana's industrial infrastructure. These local reuse initiatives support the Montana DEQ's goals of reducing the state's landfill burden while enhancing resource efficiency in the manufacturing and mining sectors.

10. Clear Business Case Summary

1. **Avoidance of Gate Fees:** Directly saving up to **\$56.75 per ton** (Helena Transfer Station rate).
2. **Reduced Logistics Costs:** By utilizing sand in local Helena or Billings region construction rather than long-hauling to remote landfills.

3. **Regulatory Efficiency:** An approved BUD provides long-term legal protection, removing the "waste" stigma and allowing the foundry to market SFS as a product.

11. Risk Management Overview

- **Stockpile Compliance:** Foundries must ensure that SFS is stored in a manner that prevents wind-blown dispersal and runoff into surface waters, per DEQ performance standards.
- **Annual Reporting:** Even with an approved BUD, foundries must submit an annual report to the DEQ documenting the tonnage and destination of all diverted material to maintain their license exemption.

12. Step-by-Step Workflow for Foundries

1. **Analytical Profiling:** Conduct a full 32-parameter chemical profile and TCLP analysis.
2. **BUD Application (BUD-0110):** Prepare and submit the formal application to the Montana DEQ.
3. **Legitimate Market Proof:** Secure a letter of intent from a circular partner (e.g., an asphalt plant).
4. **Implementation:** Once written approval is secured, roll out the reuse program and track diverted tonnage.
5. **Annual Compliance:** Submit the required beneficial use report to the DEQ every February.

13. Real Cost Savings Example

Scenario: A Helena-area industrial hub generating 3,000 tons of sand annually.

- **Disposal Cost (at \$56.75/ton Gate Rate):** \$170,250

- Reuse Program (BUD Filing + Testing + Logistics): \$45,000
- Annual Savings: \$125,250

15. General FAQ & Landfill-Specific FAQ

Q: Does a Montana BUD expire?

A: No, but the DEQ retains the authority to modify or rescind it if the material profile or production process changes significantly.

Q: Are Lewis and Clark County fees lower than Helena city rates?

A: Yes, county gate rates for MSW are around **\$24/ton**, but the **\$56.75/ton** city transfer station rate provides the strongest ROI for urban-based foundries.

16. References

1. **Administrative Rules of Montana (ARM) 17.50:** Solid Waste Management Regulations.
2. **Montana DEQ:** Beneficial Use Determination (BUD) Application and Guidance.
3. **City of Helena:** 2024-2026 Transfer Station and Solid Waste Rate Schedule.
4. **Lewis and Clark County:** Solid Waste Disposal Fees and Resolutions.
5. **Montana Department of Commerce:** Industrial Incentives for Value-Added Manufacturing.
6. **EPA SMM Technical Guidance:** Foundry Sand in Transportation Applications.