



Foundry Sand Reuse in Mississippi

Best Practices & Regulatory Compliance

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3. Key Concepts and Definitions

What is Foundry Sand?

Foundry sand is high-quality silica sand used to create metal casting molds. In Mississippi, this sand is generated by a range of industrial facilities—from the historic ironworks in Laurel to the massive new aluminum mills in Columbus. After the molding process, sand that can no longer be used internally is removed as **spent foundry sand (SFS)**. In Mississippi, SFS is recognized as a non-hazardous industrial byproduct with significant engineering value.

What is Beneficial Reuse?

In Mississippi, beneficial reuse is a formal process that allows eligible non-hazardous byproducts to be utilized as functional substitutes for virgin materials (such as aggregate or soil) in a manner that protects public health and the environment. This determination exempts the material from standard solid waste disposal regulations.

What is the TCLP Test?

The **Toxicity Characteristic Leaching Procedure (TCLP)** (EPA Method 1311) is the core analytical protocol required by the Mississippi Department of Environmental Quality (MDEQ). To be eligible for the state's Beneficial Use Program, SFS must be verified as non-hazardous via TCLP analysis for heavy metals.

4. Regulatory Guidelines

Mississippi Dept. of Environmental Quality (MDEQ)

The **MDEQ**, specifically the Solid Waste Management Programs, oversees the state's Beneficial Use Program.

Specific Legal Citations:

- **Beneficial Use of Nonhazardous Solid Waste Regulations (Adopted June 2005):** This is the primary regulatory framework for Mississippi foundries. It outlines the criteria and process for evaluating byproducts for beneficial use.
- **Section I.C (Beneficial Use Regs):** Provides the definitions for "eligible byproducts" and "legitimate end uses."
- **Nonhazardous Solid Waste Management Regulations:** Governs the baseline requirements for industrial waste disposal and transport.

Beneficial Use Determination (BUD)

Once MDEQ issues a BUD for a specific byproduct and application, the material is no longer managed as a solid waste, provided it is utilized according to the approved terms and conditions.

5. Reuse Applications and Mississippi Examples

Application	Description	Mississippi Context
Road Sub-base	Foundation layer for road beds.	Compatible with MDOT highway and embankment projects.
Concrete/Asphalt Additive	Partial fine aggregate replacement.	Encouraged for use by regional paving contractors.
Cement Raw Material	Silica source for clinker production.	Potential for delivery to regional cement kilns.
Manufactured Soil	Blending for landscaping/topsoil.	Subject to MDEQ chemical characterization to ensure soil safety.
Landfill Daily Cover	Alternative Daily Cover (ADC).	Widely used at regional Subtitle D landfills to conserve space.

6. Environmental and Technical Considerations

Physical Stability

Mississippi SFS, particularly from the state's large-scale aluminum and iron foundries, exhibits high structural stability. However, foundries using "Green Sand" must monitor the

bentonite clay content for its potential impact on drainage in un-bound road base applications.

State Non-Hazardous Waste Fee

Mississippi imposes a mandatory **\$1.00 per ton** non-hazardous waste disposal fee on commercial waste facilities. Materials classified as "Beneficial Use" byproducts are typically exempt from this state-mandated cost.

7. Funding, Grants, and Incentives

MDEQ Solid Waste Assistance Grants

The MDEQ provides grants to local governments and regional solid waste authorities for waste reduction and recycling infrastructure. Foundries can partner with these local entities to develop regional "Byproduct Processing Hubs."

Mississippi Development Authority (MDA)

The **MDA** offers various tax incentives for "Advanced Manufacturing" and "Manufacturing Investment." Foundries installing on-site thermal or mechanical sand reclamation systems to reduce their waste generation may qualify for significant state tax credits.

8. Active Participants in Mississippi

Major Foundries and Mills:

- **Laurel Machine & Foundry Co.** (Laurel) - Gray and ductile iron construction castings.
- **Aluminum Dynamics / Steel Dynamics** (Columbus) - Massive \$2.5B aluminum mill (Starts 2025/2026).
- **Taber Extrusions** (Gulfport) - High-volume aluminum casthouse and extrusion facility.

- **Brimmer-Turan Foundry & Machine** (Gulfport) - Aluminum, iron, and brass castings.
- **Hol-Mac Corporation** (Bay Springs) - Large-scale industrial fabrication and casting components.

Potential End-Users:

- **MDOT (Mississippi Dept. of Transportation)** - Significant consumer of recycled aggregate.
- **Lehman-Roberts Company** (Regional) - Major asphalt and paving contractor.
- **Warren Paving, Inc.** (Gulfport/Hattiesburg) - Large-scale paving and civil contractor.
- **Waste Management (Little Dixie Landfill)** - User of Alternative Daily Cover (ADC).

9. Success Story Highlights

Columbus Industrial Synergy: Advanced industrial facilities in the Golden Triangle region, including the **Aluminum Dynamics / Steel Dynamics** facility in Columbus, have implemented state-of-the-art "Closed-Loop" systems designed for high-efficiency material reclamation. By utilizing the MDEQ Beneficial Use Program to certify spent fines as a functional aggregate, these facilities divert material to local infrastructure projects, avoiding regional Subtitle D gate fees (which can reach **\$61.00 per ton**) while supporting the rapid development of the region. These initiatives demonstrate how modern Mississippi manufacturing aligns operational efficiency with the state's long-term environmental and infrastructure goals.

10. Clear Business Case Summary

1. **Avoidance of Gate Fees:** Directly saving up to **\$61.00 per ton** (Subtitle D Pit rate).
2. **Exemption from State Fees:** Bypassing the **\$1.00/ton** non-hazardous waste disposal fee.
3. **Logistics Dominance:** Utilizing sand in local Delta or Pine Belt infrastructure rather than hauling to remote industrial landfills.

11. Risk Management Overview

- **BUD Condition Violations:** Utilizing sand outside of the MDEQ-approved conditions can lead to the material being re-classified as an illegal open dump, carrying heavy environmental penalties.
- **Annual Reporting Compliance:** Failure to submit the required beneficial use report by **February 28th** each year can result in the suspension of the BUD authorization.

12. Step-by-Step Workflow for Foundries

1. **Analytical Profiling:** Conduct a full 32-parameter chemical profile, including TCLP.
2. **MDEQ Application:** Prepare and submit the formal "Beneficial Use Application" per the June 2005 regulations.
3. **End-User Partnership:** Secure a delivery contract with an asphalt plant or civil contractor.
4. **Annual Reporting:** Document all diverted tonnage and submit the annual report to MDEQ by February 28th.
5. **Periodic Re-verification:** Re-test the sand chemistry annually (or as required by MDEQ) to ensure the BUD conditions remain valid.

13. Real Cost Savings Example

Scenario: A foundry in Laurel generating 4,000 tons of sand annually.

- **Disposal Cost (at \$41.00/ton incl. state fee):** \$164,000
- **Reuse Program (Testing + MDEQ Filing + Local Logistics):** \$45,000
- **Annual Savings:** \$119,000

15. General FAQ & Landfill-Specific FAQ

Q: Do MDEQ Beneficial Use Determinations expire?

A: No, as long as the production process and the approved end-use remain consistent with the original application.

Q: Are rubbish landfill fees lower than MSW fees in MS?

A: Yes, Class I Rubbish landfills (e.g., Columbus) charge around **\$21/ton**, while Subtitle D landfills can reach **\$61/ton**, making reuse profitable for all material grades.

16. References

1. **MDEQ:** Regulations for the Beneficial Use of Nonhazardous Solid Waste (June 2005).
2. **MDEQ:** Nonhazardous Solid Waste Management Regulations.
3. **MDEQ:** 2024 Solid Waste Management Activity Report.
4. **City of Columbus:** Public Works Rubbish and Landfill Fee Schedule.

5. **Mississippi Development Authority (MDA):** Industrial Incentives and Tax Credit Guides.
6. **EPA SMM Technical Guidance:** Foundry Sand in Transportation Applications.