



Foundry Sand Reuse in Maine

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 in metal casting to create precise molds for Maine's diverse industrial base, including stove manufacturing, maritime components, and precision machinery. Once it can no longer be reused in the internal casting cycle—due to thermal fatigue or binder degradation—it is removed as **spent foundry sand (SFS)**. In Maine, SFS is categorized as a "**Secondary Material**" that possesses significant beneficial use potential.

What is Beneficial Reuse?

In Maine, beneficial reuse is the utilization of a secondary material (otherwise destined for disposal) in a manner that is protective of public health and the environment, serving as an effective substitute for a virgin material or commercial product. This process is governed by the Maine Department of Environmental Protection (DEP).

What is the TCLP Test?

The **Toxicity Characteristic Leaching Procedure (TCLP)** (EPA Method 1311) is the standard analysis used to determine if a waste is hazardous. For a beneficial use license in Maine, generators must provide TCLP data alongside a comprehensive "Totals Analysis" to ensure the material does not pose an unreasonable threat to the state's sensitive sub-arctic environment and groundwater.

4. Regulatory Guidelines

Maine Department of Environmental Protection (DEP)

The **Maine DEP** regulates the reuse of industrial byproducts under its Solid Waste Management Rules, specifically prioritizing diversion from landfills.

Specific Legal Citations:

- **06-096 C.M.R. Chapter 418:** "Beneficial Use of Solid Wastes." This is the primary regulatory framework for Maine foundries, outlining the standards for secondary material classification and licensing.
- **06-096 C.M.R. Chapter 419:** "Agronomic Utilization of Residuals." This applies if SFS is intended for use as a manufactured topsoil or soil amendment.
- **38 M.R.S. § 2101:** Establishes Maine's "Solid Waste Management Hierarchy," which legally prioritizes recycling and reuse over landfilling and incineration.

Licensing Categories

- **License by Rule:** For specific low-risk applications (e.g., aggregate in asphalt) where the user follows pre-established standards.
- **Full Beneficial Use License:** For non-standard applications (e.g., structural fill) requiring a detailed risk assessment and site-specific evaluation.

5. Reuse Applications and Maine Examples

Application	Description	Maine Context
Asphalt Manufacturing	Fine aggregate in hot-mix asphalt.	A preferred pathway in Maine; widely used by regional paving firms.
Landfill Daily Cover	Alternative Daily Cover (ADC).	Critical demand at Hatch Hill (Augusta) and Juniper Ridge landfills.
Road Sub-base	Foundation layer for road construction.	High potential in MaineDOT infrastructure maintenance projects.
Manufactured Soil	Blending for landscaping/erosion control.	Subject to Chapter 419 standards; used in regional buffer zone restoration.
Flowable Fill	Low-strength concrete for utility utility trenching.	Demand in Portland and Bangor urban utility expansions.

6. Environmental and Technical Considerations

Maine's PFAS Sensitivity

Maine is a national leader in regulating Per- and Polyfluoroalkyl Substances (PFAS). While foundry sand is generally not a primary source of PFAS, Maine DEP requires that any industrial byproducts used in land-based applications (like topsoil or un-bound fill) be screened to ensure zero PFAS-related risk.

Physical Stability

SFS from Maine's stove and maritime foundries often exhibits high thermal stability and uniform gradation, making it a superior structural fill material that resists the extreme freeze-thaw cycles common in the region.

7. Funding, Grants, and Incentives

Maine DEP Waste Diversion Grants

The DEP occasionally offers funding to support projects that advance the state's solid waste hierarchy. Foundries investing in internal sand reclamation or high-value reuse infrastructure can apply for these funds to subsidize capital costs.

Maine Technology Institute (MTI)

The **MTI** provides funding for innovations in "Sustainability and the Environment." Foundries developing novel sand-cleaning technologies that reduce the state's landfill burden may qualify for MTI's commercialization grants.

8. Active Participants in Maine

Major Foundries:

- **Enterprise Foundry, Inc.** (Lewiston) - Gray and ductile iron construction castings.
- **Auburn Stove Foundry, Inc.** (New Gloucester) - Custom iron and aluminum castings for wood stoves.
- **New England Castings, LLC** (Standish) - Precision alloy investment casting for aerospace.
- **Millinocket Fabrication & Machine** (Millinocket) - Industrial castings and fabrication.

Potential End-Users:

- **Pike Industries, Inc.** (Regional) - Major aggregate, asphalt, and paving contractor.
- **Shaw Brothers Construction** (Gorham) - Large-scale civil and infrastructure contractor.
- **MaineDOT (Dept. of Transportation)** - Significant consumer of recycled aggregates.
- **Casella Waste Systems (Juniper Ridge)** - Significant user of Alternative Daily Cover (ADC).

9. Success Story Highlights

Lewiston-Auburn Industrial Loop: Historic foundries in the Lewiston-Auburn industrial corridor, such as **Enterprise Foundry, Inc.**, have achieved high-efficiency internal sand reuse for decades. By transitioning their final spent sand into municipal landfill daily cover at the **Hatch Hill** facility in Augusta, these operations maintain near-zero sand disposal costs while providing the municipal landfill with an effective, low-permeability odor-control material. These long-term partnerships support Maine's statutory solid waste hierarchy (38 M.R.S. § 2101) by prioritizing the reuse of local industrial byproducts over landfilling or out-of-state transport.

10. Clear Business Case Summary

1. **Avoidance of Gate Fees:** Saving up to **\$107.50 per ton** (Portland ecomaine rate).
2. **Exemption from State Fees:** Bypassing the **\$2.00 - \$3.00/ton** state waste handling fees.

3. **Reduced Transport Burden:** Beneficial reuse sites (like local asphalt plants) are often closer than the Juniper Ridge or out-of-state landfills used for Maine's industrial waste.

11. Risk Management Overview

- **PFAS and Leachate Liability:** Foundries must maintain current analytical profiles to satisfy Maine's stringent environmental health standards for un-bound fill projects.
- **License Compliance:** Operating a reuse project without a valid Chapter 418 license or notification is a violation of state solid waste law, carrying significant environmental enforcement risks.

12. Step-by-Step Workflow for Foundries

1. **Chemical Profiling:** Conduct a 32-parameter chemical profile, including TCLP and Totals.
2. **Waste Characterization Plan:** Submit a sampling and analytical work plan to Maine DEP.
3. **Pathway Selection:** Determine if the use fits a "License by Rule" or requires a "Full Beneficial Use License."
4. **End-User Partnership:** Secure an intake agreement with a local MaineDOT project or asphalt plant.
5. **Implementation:** Maintain daily tonnage logs and annual characterization updates for state audits.

13. Real Cost Savings Example

Scenario: A manufacturer in the Portland area generating 2,000 tons of sand annually.

- Disposal Cost (at \$109.50/ton incl. state MSW fee): \$219,000
- Reuse Program (Testing + DEP Filing + Local Logistics): \$65,000
- Annual Savings: \$154,000

15. General FAQ & Landfill-Specific FAQ

Q: Do I need a license for every sand reuse project?

A: Generally yes, but many common uses (like asphalt) fall under "License by Rule," which significantly reduces the administrative burden.

Q: Are state fees included in the Bangor gate rates?

A: Charter communities like Bangor often have specific contract rates, but the **\$2.00/ton** state fee is typically an additional line item on disposal invoices.

16. References

1. 06-096 C.M.R. Chapter 418: Beneficial Use of Solid Wastes.
2. 06-096 C.M.R. Chapter 419: Agronomic Utilization of Residuals.
3. Maine Revised Statutes Title 38, § 2101: Solid Waste Management Hierarchy.
4. City of Augusta (Hatch Hill): 2024-2025 Solid Waste Gate Fee Schedule.
5. ecomaine (Portland): 2025-2026 Tipping Fee Schedule.
6. EPA SMM Technical Guidance: Foundry Sand in Transportation Applications.