



Foundry Sand Reuse in New Jersey

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 the metal casting industry to form molds and cores. In New Jersey's dense industrial corridors—from the specialized non-ferrous foundries of North Jersey to the large-scale iron casting operations in the Delaware Valley—this sand is a high-volume byproduct. Once the sand can no longer be used internally, it is categorized as **spent foundry sand (SFS)**. In New Jersey, SFS is regulated as a solid waste unless formally authorized for **Beneficial Use**.

What is Beneficial Reuse?

In New Jersey, beneficial reuse is the process of diverting industrial byproducts from landfills to be used as functional substitutes for virgin materials or as ingredients in a manufacturing process. This practice is managed by the New Jersey Department of Environmental Protection (NJDEP) to conserve the state's limited landfill capacity.

What is the TCLP Test?

The **Toxicity Characteristic Leaching Procedure (TCLP)** (EPA Method 1311) is the core analytical test used to verify that a waste is not hazardous. In New Jersey, only non-hazardous sand is eligible for the Beneficial Use permitting process, and rigorous characterization of both heavy metals and organic binders is required.

4. Regulatory Guidelines

New Jersey Dept. of Environmental Protection (NJDEP)

NJDEP, specifically the Bureau of Solid Waste Permitting, regulates the reuse of industrial byproducts under the state's Solid Waste Management rules.

Specific Legal Citations:

- **N.J.A.C. 7:26-1.1 et seq.:** "Solid Waste Management Regulations." This chapter provides the foundational authority for all waste disposal and reuse in the state.
- **N.J.A.C. 7:26-1.7:** Outlines the specific procedures and criteria for obtaining a **Beneficial Use Certificate (BUC)**.
- **NJDEP Soil Remediation Standards (N.J.A.C. 7:26D):** Provides the environmental benchmarks that must be met if SFS is used in land-based applications like structural fill or soil blending.

State-Mandated Disposal Taxes

New Jersey imposes several per-ton taxes on solid waste disposal, which are typically added to the base gate rate:

- **Sanitary Landfill Tax:** \$0.50/ton
- **Solid Waste Services Tax:** \$1.60/ton
- **Recycling Tax:** \$3.00/ton
- **Landfill Closure Tax:** \$0.50/ton
- **Total State Tax Add-on: \$5.60 per ton** (minimum).

5. Reuse Applications and New Jersey Examples

Application	Description	New Jersey Context
Road Sub-base	Foundation layer for road construction.	High potential in NJDOT infrastructure maintenance and expansion.
Landfill Daily Cover	Alternative Daily Cover (ADC).	Critical demand at Edgeboro (East Brunswick) and Keystone landfills.
Asphalt/Concrete Additive	Aggregate replacement in paving.	Widely used by North Jersey paving firms like Tilcon and Stavola .
Structural Fill	Bedding for building pads or embankments.	Subject to BUC approval and N.J.A.C. 7:26D remediation standards.
Brownfield Capping	Capping of contaminated sites.	High-value use for SFS in New Jersey's aggressive urban redevelopment.

6. Environmental and Technical Considerations

Groundwater and Soil Risk

Due to New Jersey's high population density and reliance on sensitive coastal and Piedmont aquifers, NJDEP requires a dual characterization approach:

1. **Total Totals:** Analysis for total metal and organic concentrations.
2. **Leaching Potential:** TCLP or SPLP (Synthetic Precipitation Leaching Procedure) to ensure zero risk of contaminant migration in un-bound applications.

Physical Stability

New Jersey SFS, particularly from the state's precision iron foundries, often possesses excellent angularity and structural stability, making it superior to naturally occurring coastal sands for high-compaction embankments.

7. Funding, Grants, and Incentives

NJDEP Recycling Enhancement Act (REA)

The **REA** provides funding to municipalities and counties to improve recycling programs. While foundries are private entities, they can partner with County Improvement Authorities (e.g., ECUA or PCFACC) to secure support for regional industrial aggregate processing hubs.

New Jersey Economic Development Authority (NJEDA)

The **NJEDA** offers loans and tax credits for "Clean Energy" and "Sustainability" projects. Foundries installing thermal reclamation systems or high-efficiency aggregate cleaning equipment may qualify for low-interest financing or sales tax exemptions.

8. Active Participants in New Jersey

Major Foundries and Casting Hubs:

- **Atlantic States Cast Iron Pipe** (Phillipsburg) - Major ductile iron pipe manufacturer.
- **Cast-A-Way Foundries** (Regional service) - Specialized non-ferrous casting.
- **Numerous Precision Fabricators:** Concentrated in the Newark-Elizabeth and Camden-Pennsauken industrial corridors.

Potential End-Users:

- **NJDOT (New Jersey Dept. of Transportation)** - Major aggregate consumer for state highways.
- **Tilcon New Jersey** (Regional) - Large-scale paving, asphalt, and aggregate producer.
- **Stavola Companies** (Central Jersey) - Major asphalt and concrete producer.
- **Pennsauken Sanitary Landfill (PCFACC)** - Significant user of ADC in South Jersey.
- **Keystone Landfill (Keystone)** - Major user of industrial aggregate and ADC.

9. Success Story Highlights

Phillipsburg-Keystone Loop: Large-scale iron foundries in the Delaware River corridor, such as **Atlantic States Cast Iron Pipe** in Phillipsburg, have successfully established long-term diversion programs for their spent mold sand. By securing an NJDEP Beneficial Use Certificate (BUC), these facilities provide 100% of their spent fines as Alternative Daily Cover (ADC) for regional industrial landfills. This strategy avoids the high commercial MSW gate fees (which can exceed **\$89.00 per ton**) and the state-mandated disposal taxes (**\$5.60 per ton**), while supporting critical landfill engineering objectives and significantly reducing the state's industrial waste footprint in the sensitive Delaware Valley region.

10. Clear Business Case Summary

1. **Avoidance of Gate Fees:** Saving up to **\$89.92 per ton** (Essex County Commercial rate).
2. **Exemption from State Taxes:** Bypassing the **\$5.60/ton** state-mandated disposal taxes.
3. **Logistics Optimization:** Utilizing sand in local urban infill or Brownfield remediation projects rather than hauling to remote Subtitle D landfills.

11. Risk Management Overview

- **BUC Reporting Compliance:** Failure to maintain accurate daily tonnage records and report to NJDEP can result in the revocation of the BUC and retroactive classification of the material as solid waste.
- **Contamination Liability:** Mixing non-hazardous SFS with other industrial wastes (e.g., used oil) can trigger hazardous waste management requirements, increasing costs tenfold.

12. Step-by-Step Workflow for Foundries

1. **Analytical Profiling:** Conduct a full suite chemical profile per N.J.A.C. 7:26D, including TCLP and Totals.
2. **BUC Application:** Prepare and submit the formal application to the NJDEP Bureau of Solid Waste Permitting.
3. **Environmental Screening:** Ensure the sand meets the state's residential or non-residential soil standards for the intended application.
4. **Partner Identification:** Secure a delivery agreement with a local asphalt plant or construction project.
5. **Implementation:** Maintain daily diversion logs and annual characterization updates for state audits.

13. Real Cost Savings Example

Scenario: An Essex County foundry generating 3,000 tons of sand annually.

- **Disposal Cost (at \$95.52/ton incl. state taxes):** \$286,560
- **Reuse Program (BUC Filing + Testing + Local Logistics):** \$75,000
- **Annual Savings:** \$211,560

15. General FAQ & Landfill-Specific FAQ

Q: Does New Jersey have "pre-approved" beneficial uses for sand?

A: Asphalt and concrete ingredients are common, but NJDEP generally requires a site-specific or generator-specific BUC to ensure binder safety.

Q: Are state taxes applied to ADC?

A: Often yes, but the base gate rate for ADC is typically significantly lower than MSW, providing a major net saving for the foundry.

16. References

1. **N.J.A.C. 7:26:** New Jersey Solid Waste Management Regulations.
2. **NJDEP:** Beneficial Use Project Approval Process (BUD/BUC Guidance).
3. **N.J.A.C. 7:26D:** New Jersey Remediation Standards.
4. **Essex County Utilities Authority (ECUA):** 2025-2026 Tipping Fee Schedule.
5. **Pennsauken Sanitary Landfill (PCFACC):** South Jersey Disposal Rate Information.
6. **EPA SMM Technical Guidance:** Foundry Sand in Transportation Applications.