



Foundry Sand Reuse in Kentucky

Best Practices & Regulatory Compliance

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3. Key Concepts and Definitions

What is Foundry Sand?

Foundry sand is high-grade silica sand used by Kentucky's extensive automotive, aerospace, and industrial casting sectors to form metal molds. Kentucky's "Auto Alley" (I-65 and I-75 corridors) hosts a high density of foundries supplying major OEMs. After multiple reuse cycles within the foundry, the sand becomes **spent foundry sand (SFS)**. In Kentucky, this material is typically non-hazardous and categorized as a "Special Waste" due to its industrial origin and potential for large-scale beneficial reuse.

What is Beneficial Reuse?

In Kentucky, beneficial reuse is the application of solid waste or special waste as a functional substitute for virgin material in a manner that protects public health and the environment. Kentucky encourages this practice through a simplified regulatory pathway to reduce the state's reliance on Subtitle D landfills.

What is the TCLP Test?

The **Toxicity Characteristic Leaching Procedure (TCLP)** (EPA Method 1311) is the core test required by Kentucky DEP to confirm that a waste is not hazardous. Only non-hazardous SFS is eligible for the state's streamlined "Permit-by-Rule" beneficial reuse category.

4. Regulatory Guidelines

Kentucky Dept. for Environmental Protection (DEP)

The **Kentucky DEP**, specifically the Division of Waste Management, oversees solid waste and beneficial reuse through its Administrative Regulations.

Specific Legal Citations:

- **401 KAR 47:150, Section 1:** "Solid Waste Management Practice Permitted by Rule." This is the primary regulatory mechanism for Kentucky foundries, allowing certain reuse activities to proceed without a formal written permit if they meet performance standards.
- **401 KAR 47:030:** "Environmental Performance Standards." Outlines the minimum criteria all reuse projects must meet to ensure zero impact on groundwater, surface water, and public health.
- **DEP 7098:** The formal application form for those seeking written concurrence for a Permit-by-Rule activity.

Environmental Remediation Fee (ERF)

Kentucky law assesses a mandatory **\$1.75 per ton** Environmental Remediation Fee on all solid waste disposed of in MSW landfills. Diverting sand for beneficial reuse typically allows a generator to bypass this state-mandated cost.

5. Reuse Applications and Kentucky Examples

Application	Description	Kentucky Context
Road Sub-base	Foundation layer for road beds.	High demand in KYTC (Kentucky Transportation Cabinet) projects.
Flowable Fill	Low-strength concrete for utility utility projects.	Used extensively in Louisville and Lexington municipal utility trenching.
Cement Raw Material	Silica source for cement production.	Potential for delivery to Kosmos Cement or Cemex kilns.
Structural Fill	Bedding for building pads or embankments.	Permissible under Permit-by-Rule if a legitimate intended use is documented.
Landfill Daily Cover	Alternative Daily Cover (ADC).	Standard practice at regional landfills to conserve MSW capacity.

6. Environmental and Technical Considerations

Karst Groundwater Sensitivity

Much of Kentucky—particularly the Bluegrass and Pennyryle regions—sits on "Karst" topography (sinkholes and caves). Kentucky DEP requires that reuse projects in un-bound

structural fill ensure zero leachate impact on these highly sensitive and rapidly-moving groundwater systems.

Physical Properties

SFS from Kentucky's high-precision automotive foundries is extremely uniform, often outperforming local bank-run sand for drainage and compaction in highway embankment projects.

7. Funding, Grants, and Incentives

ERF Trust Fund Projects

The mandatory \$1.75/ton disposal fee funds the **Kentucky Environmental Remediation Fee (ERF) Trust Fund**, which supports recycling and waste-reduction initiatives. Foundries partnering with local governments can leverage these funds for regional recycling hubs.

Bluegrass State Skills Corporation (BSSC)

Foundries that invest in advanced environmental equipment (e.g., thermal sand reclamation) may qualify for BSSC tax credits if the project involves significant technical workforce training for the new machinery.

8. Active Participants in Kentucky

Major Foundries:

- **Dameron Alloy Foundries** (Louisville) - High-precision investment casting for aerospace.
- **J.R. Hoe & Sons** (Middlesboro/Louisville) - Gray and ductile iron construction castings.
- **Contract Machining & Manufacturing** (Lexington) - Gray iron and aluminum castings.

- **Tri-Arrows Aluminum** (Louisville) - Large-scale aluminum casting and processing.
- **Kentucky Aluminum Processors** (Russellville) - New aluminum recycling and casting hub (Starts 2026).

Potential End-Users:

- **Rogers Group, Inc.** (Regional) - Major aggregate, asphalt, and civil contractor.
- **Scotty's Contracting & Stone** (Bowling Green) - Large-scale paving and aggregate supplier.
- **Kosmos Cement Company** (Louisville) - Significant silica consumer for clinker production.
- **KYTC (Kentucky Transportation Cabinet)** - Consumer of aggregate for state infrastructure.

9. Success Story Highlights

Bowling Green Infrastructure Loop: Industrial manufacturers in the Warren County area have successfully established "Special Waste" diversion programs for spent mold sand from casting operations. By utilizing the Permit-by-Rule provisions of 401 KAR 47:150, these facilities provide sand as a "functional substitute" for virgin aggregate in regional infrastructure and bridge embankment projects. This strategy avoids the high C&D gate fees (which can reach **\$93.00 per ton**) at local transfer stations and bypasses the state's **\$1.75 per ton** Environmental Remediation Fee, while supporting regional Kentucky Transportation Cabinet (KYTC) highway improvements with high-quality, local aggregate.

10. Clear Business Case Summary

1. **Avoidance of State Fees:** Bypassing the \$1.75/ton ERF trust fund fee.
2. **Avoidance of Gate Fees:** Saving up to **\$61.00 - \$93.00 per ton** (Urban Private MSW/C&D rates).
3. **Logistics Dominance:** Utilizing sand in local Bluegrass region construction rather than hauling to remote Subtitle D landfills.

11. Risk Management Overview

- **Performance Standard Violations:** Failure to meet 401 KAR 47:030 can lead to the revocation of Permit-by-Rule status and retroactive classification of the reuse site as an illegal dump.
- **Leachate Verification:** For un-bound structural fill, foundries must maintain professional engineering documentation proving that the sand does not pose a risk to Kentucky's sensitive karst groundwater.

12. Step-by-Step Workflow for Foundries

1. **Analytical Profiling:** Conduct a full 32-parameter TCLP and totals analysis.
2. **Permit-by-Rule Review:** Verify that the intended reuse fits the criteria of **401 KAR 47:150**.
3. **DEP 7098 Submission (Optional but Recommended):** Submit for formal DEP written concurrence to shield against future liability.
4. **End-User Match:** Identify a "Circular Partner" (e.g., an asphalt plant or civil contractor).
5. **Implementation:** maintain annual verification testing to ensure the material profile remains consistent.

13. Real Cost Savings Example

Scenario: A Louisville-area foundry generating 5,000 tons of sand annually.

- **Disposal Cost (at \$62.75/ton incl. ERF fee):** \$313,750
- **Reuse Program (DEP Filing + Testing + Logistics):** \$75,000
- **Annual Savings:** \$238,750

15. General FAQ & Landfill-Specific FAQ

Q: Does Kentucky require a permit for structural fill using sand?

A: Often no; if the use is legitimate and meets performance standards, it is "Permitted-by-Rule," though filing Form DEP 7098 is recommended for added security.

Q: Are state fees included in the gate rates?

A: Most Kentucky landfills list their base rate + the **\$1.75/ton ERF fee** separately on commercial invoices.

16. References

1. **401 KAR 47:150:** [Special Types of Permits \(Permit-by-Rule\)](#).
2. **401 KAR 47:030:** [Environmental Performance Standards](#).

3. **Kentucky DEP:** Forms and Guidance for Waste Management.
4. **Kentucky Energy and Environment Cabinet:** 2025 Solid Waste Planning and Management Report.
5. **Apex Transfer Station (Bowling Green):** 2024-2025 C&D Disposal Rates.
6. **EPA SMM Technical Guidance:** Foundry Sand in Transportation Applications.