Foundry Sand Reuse in Oregon

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 and cores for Oregon's diverse industrial sectors, including maritime, mining, and aerospace manufacturing. Once the sand can no longer be reused internally—due to binder saturation or thermal fatigue—it is removed as **spent foundry sand (SFS)**. In Oregon, this material is categorized as a solid waste unless it is formally authorized for **Beneficial Use**.

What is Beneficial Reuse?

In Oregon, beneficial reuse is the utilization of a solid waste in a manner that provides a documented environmental or economic advantage, serving as a functional substitute for virgin materials. This process is governed by the Oregon Department of Environmental Quality (DEQ) to ensure the protection of the state's vital surface water and groundwater resources.

What is the TCLP Test?

The **Toxicity Characteristic Leaching Procedure (TCLP)** (EPA Method 1311) is the standard analysis used to verify that a waste is not hazardous. In Oregon, passing TCLP is the first technical requirement to qualify for the Beneficial Use permitting pathway under **OAR 340-093-0260**.

4. Regulatory Guidelines

Oregon Department of Environmental Quality (DEQ)

The **Oregon DEQ**, specifically the Land Quality Division, regulates the reuse of industrial byproducts under the state's solid waste management rules.

Specific Legal Citations:

- **OAR 340-093-0260**: "Beneficial Use." This is the primary regulatory framework for Oregon foundries. it provides two pathways:
    1. **Pre-approved Use**: Specific low-risk applications (e.g., aggregate in asphalt) that do not require case-specific DEQ approval if they meet established standards.
    2. **Case-Specific Approval**: For unique materials or applications requiring a detailed DEQ review of chemical and physical data.
- **OAR 340-093-0270**: Outlines the application requirements for a Case-Specific Beneficial Use determination.
- **OAR 340-093-0280**: Performance standards for the storage and handling of beneficially used materials.

Metro Regional Requirements

For foundries located within the **Portland Metro** boundaries (Clackamas, Multnomah, and Washington counties), additional regional disposal and recycling surcharges apply, making diversion even more economically critical.

5. Reuse Applications and Oregon Examples

Application	Description	Oregon Context
Road Sub-base	Foundation layer for road construction.	High potential in **ODOT** infrastructure and municipal road beds.
Landfill Daily Cover	Alternative Daily Cover (ADC).	Critically needed at **Short Mountain (Lane County)** and **Hillsboro** landfills.
Asphalt Additive	Fine aggregate in hot-mix asphalt.	A common pre-approved pathway; used by major regional paving firms.
Controlled Low-Strength Fill	Flowable fill for utility utility trenching.	High demand in Portland and Eugene urban utility expansions.
Structural Fill	Bedding for building pads or embankments.	Subject to Case-Specific DEQ risk assessment and OAR performance standards.

6. Environmental and Technical Considerations

Groundwater and Watershed Protection

Due to Oregon's reliance on sensitive aquifers (e.g., the Willamette Valley) and pristine surface water systems, DEQ requires a detailed risk assessment for any un-bound structural fill projects. Foundries must ensure SFS meets the state's most conservative Risk-Based Decision Making (RBDM) benchmarks for soil and water contact.

Physical Stability

SFS from Oregon's industrial foundries (e.g., ESCO) often possesses excellent structural stability and uniform gradation. This makes it a superior material for "flowable fill" that resists the high-moisture conditions common in Western Oregon while remaining easy to excavate.

7. Funding, Grants, and Incentives

DEQ Materials Management Grants

The Oregon DEQ provides competitive grants to support projects that reduce the environmental impact of materials throughout their lifecycle. Foundries developing regional "Recycled Aggregate Hubs" or installing sand-cleaning technology can apply for these funds.

Energy Trust of Oregon

While primarily focused on energy, the **Energy Trust** supports industrial efficiency projects that reduce the carbon intensity of manufacturing. Projects that eliminate the energy-intensive "High-Haul" transport of waste by utilizing local reuse may qualify for technical support.

8. Active Participants in Oregon

Major Foundries:

- **ESCO Corporation** (Portland) - Global leader in casting for mining and infrastructure.
- **TVT Die Casting** (Portland) - High-volume precision aluminum and zinc casting.
- **Eagle Foundry** (Hillsboro area) - Specialized iron and steel sand casting.
- **Western Cast** (Regional service) - Precision fabrication and casting hubs.

Potential End-Users:

- **Knife River Corporation** (Regional) - Major aggregate, asphalt, and concrete producer.
- **Lakeside Industries, Inc.** (Portland/Regional) - Large-scale paving and asphalt contractor.
- **ODOT (Oregon Dept. of Transportation)** - Significant consumer of aggregate for highway construction.
- **Oregon Metro (Solid Waste Services)** - Major user of ADC at regional transfer and disposal sites.

9. Success Story Highlights

Willamette Valley Industrial Synergy: Ferrous foundries in the Portland-Hillsboro industrial corridor, such as **ESCO Corporation**, have successfully established long-term "Closed-Loop" partnerships with local asphalt plants. By utilizing the pre-approved Beneficial Use status under OAR 340-093-0260 for their spent "Green Sand," these facilities bypass the high gate fees at Metro transfer stations (which currently reach **$162.14 per ton**) and avoid regional commercial tonnage surcharges. These initiatives provide paving companies with a high-purity, local silica source that replaces carbon-intensive virgin aggregate, aligning with Oregon’s state materials management goals while significantly reducing industrial waste disposal costs.

10. Clear Business Case Summary

1. **Avoidance of Gate Fees**: Directly saving up to **$162.14 per ton** (Portland Metro 2025 rate).

2. **Exemption from Regional Fees**: Bypassing the Portland Metro **$16.60/ton** commercial tonnage fee and associated surcharges.
3. **Logistics Optimization**: Utilizing sand in local Willamette Valley construction rather than hauling to remote Subtitle D landfills like Coffin Butte.

11. Risk Management Overview

- **Stockpile Performance Standards**: Foundries must ensure that SFS is stored per OAR 340-093-0280 to prevent wind-blown dispersal and contact with stormwater runoff.
- **BUD Reporting Compliance**: Failure to maintain accurate daily tonnage records and report to DEQ (when required by a case-specific permit) can result in the revocation of the reuse status.

12. Step-by-Step Workflow for Foundries

1. **Analytical Profiling**: Conduct a full 32-parameter chemical profile, including TCLP and totals.
2. **Pre-approved Use Check**: Verify if the intended reuse fits the criteria for "Pre-approved Use" under **OAR 340-093-0260**.
3. **DEQ Consultation**: For non-standard uses, consult with regional DEQ Land Quality staff (Portland, Salem, or Eugene).
4. **End-User Partnership**: Secure an intake agreement with a local ODOT project or asphalt plant.
5. **Implementation**: Maintain records of diverted tonnage for annual state materials management reporting.

13. Real Cost Savings Example

Scenario: A Portland-area foundry generating 2,000 tons of sand annually.

- **Disposal Cost (at $162.14/ton Gate Rate)**: $324,280
- **Reuse Program (Testing + Logistics + Local Transport)**: $75,000
- **Annual Savings**: **$249,280**

15. General FAQ & Landfill-Specific FAQ

Q: Does Oregon require a case-specific permit for sand reuse in asphalt?
A: Often no; many common paving applications are considered "Pre-approved" if the sand meets specific chemical benchmarks.

Q: Why are Portland Metro fees so much higher than Salem?
A: Portland Metro rates ($162/ton) include regional system benefit fees and regional

planning surcharges that are not present in most county-run systems like Marion County ($130/ton).

16. References

1. **OAR 340-093-0260**: Beneficial Use of Solid Waste Regulations.
2. **Oregon DEQ**: Beneficial Use Determinations Guidance and Applications.
3. **Oregon Metro**: 2025-2026 Solid Waste Fee Schedule.
4. **Marion County**: Solid Waste and Recovery Fee Schedule.
5. **Lane County**: Short Mountain Landfill Rate Information.
6. **EPA SMM Technical Guidance**: Foundry Sand in Transportation Applications.