



Foundry Sand Reuse in New Mexico

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 process to create molds for artistic, industrial, and precision components. In New Mexico, while the industrial base for primary iron production is compact, the state hosts a world-renowned fine art bronze casting sector (Santa Fe area) and high-tech manufacturing hubs (Albuquerque). Once the sand can no longer be used internally, it is removed as **spent foundry sand (SFS)**. In New Mexico, this material is typically non-hazardous and has high structural potential for arid-zone civil engineering.

What is Beneficial Reuse?

In New Mexico, beneficial reuse is the application of a solid waste material as a functional substitute for a commercial product or virgin material in a manner that protects the state's sensitive groundwater and arid soil profiles. This process is governed by the New Mexico Environment Department (NMED).

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. In New Mexico, passing TCLP is the first technical requirement to qualify for beneficial reuse pathways under the state's solid waste rules.

4. Regulatory Guidelines

New Mexico Environment Department (NMED)

The **NMED**, specifically the Solid Waste Bureau, regulates the disposal and reuse of industrial byproducts.

Specific Legal Citations:

- **20.9.2 NMAC:** "Solid Waste Management." Provides the foundational regulatory framework for all waste handling in the state.
- **20.9.2.11 NMAC:** "Special Waste Requirements." Industrial materials like foundry sand may be classified as special waste if they require specific handling, but they are eligible for reuse if characterized as non-hazardous.
- **NMSA 1978, § 74-9-1 et seq.:** The "Solid Waste Act," which grants NMED the authority to promote waste reduction and material recovery.

Permitting for Reuse

New Mexico typically evaluates large-scale reuse projects on a case-by-case basis. Generators must provide detailed chemical characterization to NMED to prove that the SFS is inert and suitable for the intended application (e.g., structural fill).

5. Reuse Applications and New Mexico Examples

Application	Description	New Mexico Context
Structural Fill	Bedding for building pads or embankments.	High value in the Albuquerque-Rio Rancho development corridors.
Landfill Daily Cover	Alternative Daily Cover (ADC).	Widely used at the Caja del Rio (Santa Fe) and Corralitos landfills.
Asphalt Manufacturing	Fine aggregate in hot-mix asphalt.	A viable reuse pathway for Central New Mexico paving firms.
Manufactured Soil	Blending with organics for arid landscaping.	Subject to NMED evaluation for trace metals and binder stability.
Flowable Fill	Low-strength concrete for utility trenching.	Demand in Santa Fe and Las Cruces urban utility projects.

6. Environmental and Technical Considerations

Arid Environment Performance

- **Dust Suppression:** In New Mexico’s high-desert climate, SFS handling must comply with local air quality rules to prevent particulate matter (wind-blown sand) from impacting regional visibility and health.

- **Leaching in High-pH Soils:** Nevada's naturally alkaline soils can influence the mobility of certain binders; projects in sensitive groundwater basins may require additional leaching analysis beyond standard TCLP.

Physical Stability

SFS from New Mexico's art and precision foundries is often highly uniform. This makes it a superior material for specialized "flowable fill" that provides stable support for utility lines while remaining easy to excavate for future repairs.

7. Funding, Grants, and Incentives

NMED Recycling and Illegal Dumping (RAID) Grants

The RAID program provides funding for waste diversion and recycling projects. Foundries partnering with local governments to create "Byproduct Utilization Hubs" may qualify for RAID funds to offset transport and testing costs.

New Mexico Economic Development Dept (NMEDD)

The state offers various tax incentives (e.g., the **Job Training Incentive Program - JTIP**) for manufacturers that invest in clean technology. Foundries installing sand reclamation systems may qualify for support through regional development initiatives.

8. Active Participants in New Mexico

Major Foundries and Casting Hubs:

- **Los Ranchos de Albuquerque Foundry** (Albuquerque area) - Fine art bronze casting from small to monumental scale.

- **Shidoni Foundry** (Tesuque/Santa Fe) - World-renowned art foundry casting bronze, iron, brass, and steel.
- **Vinnetti's Bronze Foundry** (Santa Fe) - Full-service art and monument casting.
- **Ruidoso Metal Works** (Ruidoso) - Precision investment casting for jewelry and art.
- **Intel Foundry Services** (Rio Rancho) - Advanced semiconductor manufacturing (Silicon focus).

Potential End-Users:

- **NMDOT (New Mexico Dept. of Transportation)** - Major aggregate consumer for state highway projects.
- **South Central Solid Waste Authority (SCSWA)** - Significant user of ADC at Corralitos Landfill.
- **Santa Fe Solid Waste Management Agency** - Major user of industrial aggregate and ADC.
- **Regional Paving Firms**: Local contractors in the ABQ-Santa Fe corridor.

9. Success Story Highlights

Santa Fe Art-Aggregate Synergy: Art and precision foundries in the Santa Fe-Tesuque corridor, such as **Shidoni Foundry**, have successfully established diversion programs for their spent silica mold sand. By characterizing the material as a non-hazardous, inert byproduct under 20.9.2 NMAC, these facilities provide a localized aggregate source for municipal flowable fill and structural fill projects. This strategy avoids the high gate fees at regional transfer stations (which can reach **\$62.50 per ton**) while directly supporting Santa Fe's long-term goal of utilizing high-quality, local recycled industrial materials in sustainable urban development and infrastructure.

10. Clear Business Case Summary

1. **Avoidance of Gate Fees:** Directly saving up to **\$66.07 per ton** (Las Cruces Amador TS rate).

2. **Transportation Savings:** By utilizing sand in local North-Central NM construction rather than hauling to remote Subtitle D landfills.
3. **Regulatory Security:** Documenting SFS as an "Inert Product" removes the "waste" stigma and disposal reporting requirements.

11. Risk Management Overview

- **Dust Mitigation Violations:** Large stockpiles of SFS must be managed with active suppressants or enclosures to avoid Air Quality Bureau fines.
- **Groundwater Impact:** Projects must be sited away from primary aquifers to satisfy NMED's conservative environmental screening levels for land application.

12. Step-by-Step Workflow for Foundries

1. **Analytical Profiling:** Conduct a full 32-parameter chemical profile, including TCLP and totals.
2. **NMED Consultation:** Contact the Solid Waste Bureau to discuss the "Inert Material" classification for the specific sand stream.
3. **End-User Partnership:** Identify a local construction project or asphalt plant for sand intake.
4. **Logistics Documentation:** Maintain records of material weights and destinations for 5 years.
5. **Annual Review:** Re-verify sand chemistry annually to ensure the material remains consistent with initial characterization.

13. Real Cost Savings Example

Scenario: A Santa Fe area foundry generating 1,000 tons of sand annually.

- **Disposal Cost (at \$62.50/ton Gate Rate): \$62,500**
- **Reuse Program (Testing + NMED Filing + Local Logistics): \$25,000**
- **Annual Savings: \$37,500**

15. General FAQ & Landfill-Specific FAQ

Q: Does New Mexico have a "Beneficial Use Determination" permit?

A: NMED evaluates reuse through the "Special Waste" or "Inert Material" classification process under 20.9.2 NMAC.

Q: Are Albuquerque fees lower than Santa Fe?

A: Yes, ABQ gate rates for MSW are around **\$30/ton**, while Santa Fe rates reach **\$62.50/ton**, making reuse particularly profitable in the state capital region.

16. References

1. **20.9.2 NMAC:** New Mexico Solid Waste Management Regulations.
2. **NMED:** Recycling and Illegal Dumping (RAID) Grant Program.
3. **City of Albuquerque:** Residential and Commercial Collection and Disposal Rates.
4. **Santa Fe Solid Waste Management Agency (SFSWMA):** Schedule of Fees for Caja del Rio Landfill.
5. **South Central Solid Waste Authority (SCSWA):** Las Cruces and Dona Ana County Disposal Rates.
6. **EPA SMM Technical Guidance:** Foundry Sand in Transportation Applications.