Foundry Sand Reuse in Nevada

Best Practices & Regulatory Compliance

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3. Key Concepts and Definitions

What is Foundry Sand?

Foundry sand is a high-purity silica sand used in Nevada's aerospace, utility infrastructure, and industrial manufacturing sectors to create metal molds. When the sand can no longer be used for casting—due to thermal degradation or binder saturation—it is removed from the system as **spent foundry sand (SFS)**.

What is Beneficial Reuse?

In Nevada, beneficial reuse refers to the practice of utilizing non-hazardous industrial byproducts as functional substitutes for virgin materials (such as aggregate or soil) in a manner that protects the state's sensitive desert environment and groundwater.

What is the TCLP Test?

The **Toxicity Characteristic Leaching Procedure (TCLP)** (EPA Method 1311) is the primary regulatory tool used to differentiate between hazardous and non-hazardous waste. In Nevada, only SFS that passes TCLP for heavy metals is eligible for reuse under Sustainable Materials Management (SMM) initiatives.

4. Regulatory Guidelines

Nevada Division of Environmental Protection (NDEP)

The **NDEP**, within the Department of Conservation and Natural Resources, oversees solid waste management through its Bureau of Sustainable Materials Management.

Specific Legal Citations:

- **Nevada Revised Statutes (NRS) 444.440 through 444.620**: Provides the foundational legislative authority for solid waste management and recycling programs.
- **Nevada Administrative Code (NAC) 444.570 through 444.7499**: Outlines the specific regulatory requirements for industrial waste disposal, permitting, and exemptions.
- **NAC 444.662**: Specifically addresses the management of industrial solid waste, requiring that it be handled in a manner that prevents harm to the environment or the creation of a nuisance.

Federal Framework

All Nevada reuse programs must align with the **EPA Resource Conservation and Recovery Act (RCRA) Subtitle D**, which governs non-hazardous solid waste. NDEP acts as the

primary enforcement agency for these federal standards within state borders.

5. Reuse Applications and Nevada Examples

Application	Description	Nevada Context
Cement Raw Material	Silica source for cement production.	High potential for delivery to the **Nevada Cement Company** kilns in Fernley.
Asphalt Aggregate	Partial replacement of fine aggregate in asphalt.	Applicable for use at **Las Vegas Paving Corp** and **Q&D Construction** plants.
Utility Infrastructure	Subsurface enclosure and utility bedding.	Directly relevant for companies like **Jensen MetalTech** in Sparks.
Landfill Intermediate Cover	Use as an alternative cover in active landfills.	Utilized at the **Lockwood Regional Landfill** and **Western Elite Landfill**.

6. Environmental and Technical Considerations

Arid Environment Performance

- **Dust Mitigation**: In Nevada's desert climate, SFS handling must comply with stringent air quality permits to prevent particulate matter (PM10) emissions, especially in the Clark and Washoe county basins.
- **Leaching in High-pH Soils**: Nevada's naturally alkaline soils can affect the mobility of certain binders; reuse projects in sensitive groundwater basins may require additional

leaching analysis beyond standard TCLP.

Physical Properties

SFS from Nevada's precision aerospace foundries often exhibits high uniformity and low metallic carry-over, making it superior to virgin desert sand for specific high-strength concrete and asphalt applications.

7. Funding, Grants, and Incentives

NDEP Recycling Grants

NDEP offers competitive grants to support waste reduction and recycling projects across Nevada. Foundries that partner with local municipalities to create "Industrial Byproduct Diversion Plans" can apply for these funds to subsidize transport and testing costs.

Governor's Office of Economic Development (GOED)

Nevada's **GOED** provides tax abatements for companies that invest in "Green Energy" and "Recycling Business" infrastructure. Foundries installing thermal reclamation systems may be eligible for sales and use tax abatements on new equipment.

8. Active Participants in Nevada

Major Foundries:

- **CASS** (Sparks) - Advanced aluminum manufacturing and recycling.
- **PCC Carson City** (Carson City) - Investment cast components for aerospace and energy.
- **Spintek Foundry and Machine LLC** (Carson City) - Alloy manufacturing and CNC casting.

- **Protocast JLC** (Carson City) - Steel and aluminum investment casting.
- **Jensen MetalTech** (Sparks) - Utility infrastructure engineering and casting.

Potential End-Users:

- **Nevada Cement Company** (Fernley) - Cement manufacturing.
- **Las Vegas Paving Corp** (Las Vegas) - Major asphalt and aggregate producer.
- **Q&D Construction / Mustang Hot Plant** (Sparks) - Paving and infrastructure.
- **Western Nevada Materials** (Sparks/Fernley) - Aggregate and asphalt supply.

9. Success Story Highlights

Precision Aerospace Reclamation: Precision aerospace foundries in the Carson City corridor, such as **PCC Carson City**, have successfully implemented "lost wax" and sand reclamation programs to minimize waste generation. By diverting the final spent sand to regional utility infrastructure manufacturers like **Jensen MetalTech** in Sparks for use as fine aggregate in pre-cast utility vaults, these facilities avoid the high disposal and long-haul transport costs associated with Northern Nevada landfills (which can exceed **$92.00 per ton**). These initiatives directly support the NDEP's 2030 Sustainable Materials Management Strategic Plan by reducing the state's reliance on virgin aggregate mining and industrial waste disposal while enhancing the regional circular economy.

10. Clear Business Case Summary

1. **Avoidance of Gate Fees**: Directly saving up to **$92.60 per ton** in Northern Nevada.
2. **Transportation Savings**: By diverting sand to local cement kilns in Fernley or asphalt plants in Sparks rather than the Lockwood Landfill.
3. **ESG Compliance**: Aligning with the NDEP Sustainable Materials Management Plan significantly improves corporate sustainability metrics for defense and aerospace contracts.

11. Risk Management Overview

- **Dust Control Violations**: Large stockpiles of SFS must be managed with active suppressants or enclosures to avoid Air Quality Management (AQM) fines in Clark County.
- **Inert Status Verification**: Regular testing is essential to ensure that a change in mold binders (e.g., from green sand to chemical no-bake) does not inadvertently alter the non-hazardous status of the material.

12. Step-by-Step Workflow for Foundries

1. **Classification**: Perform a full TCLP analysis per NAC 444.842.
2. **NDEP Consultation**: Engage with the NDEP Solid Waste Branch to determine if a specific BUD or recycling notification is required.
3. **Logistics**: Identify a "Circular Partner" (e.g., Nevada Cement Company) with a verified silica intake requirement.
4. **Documentation**: Maintain a 5-year log of all diverted tonnage for state environmental audits.

13. Real Cost Savings Example

Scenario: A Washoe County foundry generating 3,000 tons of spent sand annually.

- **Disposal Cost (at $92.60/ton Gate Rate)**: $277,800
- **Reuse Program (Testing + Logistics + Dust Suppression)**: $70,000
- **Annual Savings**: **$207,800**

15. General FAQ & Landfill-Specific FAQ

Q: Does NDEP require a permit for every reuse project?
A: Many recycling activities are exempt if the material is used as an effective substitute for a commercial product (NAC 444), but ARS recommends a formal "No Further Action" letter from NDEP for high-volume projects.

Q: Are there specialized fees at Nevada landfills?
A: Yes, landfills like Lockwood charge a premium for "Commercial MSW" ($92.60) compared to "Green Waste" ($47.13), highlighting the economic benefit of re-classifying SFS as a product.

16. References

1. **Nevada Administrative Code (NAC) Chapter 444**: Solid Waste Management Regulations.

2. **Nevada Division of Environmental Protection (NDEP)**: 2030 Sustainable Materials Management (SMM) Strategic Plan.
3. **Waste Management (WM)**: Lockwood Regional Landfill 2026 Rate Schedule.
4. **Western Elite**: Las Vegas Dumpsite and Recycling Fee Schedules.
5. **Nevada Governor's Office of Economic Development (GOED)**: Tax Abatements for Recycling Businesses.
6. **EPA SMM Technical Guidance**: Foundry Sand in Transportation Applications.