

A Waste Is a Terrible Thing to Mind -- Identification and Management of Solid and Hazardous Waste in the Mining Industry

Dean C. Miller

Davis Graham & Stubbs LLP



Roadmap

- What's at Stake
- RCRA 101
 - Hazardous Waste vs. Solid Waste
 - Management Requirements for Each
 - Hazardous Waste Exemptions

Roadmap

- The Bevill Exemption
 - What are Bevill wastes?
- How do you establish and maintain the Bevill status of your wastes?
- How do you lose the Bevill exemption?
 - The “Bevill Mixture Rule”
 - Engage in Mineral Processing rather than Beneficiation

Mineral Processing Is On EPA's Radar Screen

- On October 12, 2007, EPA announced that its enforcement priorities for the next three years include increased enforcement against mineral processing facilities (72 F.R. 58084).

What's at Stake?

- Managing mining-related waste as “solid waste” versus “hazardous waste”
- Solid waste regulations much less stringent than hazardous waste regulations
- Substantial penalties and corrective action requirements for RCRA violations

Worst Case Scenario

- You do not want to have to manage your tailings ponds or other Bevill-excluded impoundments as hazardous waste Treatment, Storage and Disposal facilities
 - Serious leverage for regulators

Hazardous Waste Management Requirements

- Identify and count wastes
- Obtain EPA ID number
- Comply with accumulation and storage requirements (including requirements for training, contingency planning, and emergency arrangements)
- *Potential corrective action/cleanup requirements*
- Track shipment and receipt of waste
- Meet record-keeping and reporting requirements

Solid Waste Management

- No open dumping
- Disposal facilities must not threaten endangered species, surface water, ground water, or flood plains
- Restrict public access
- Restrict land spreading of certain wastes
- Minimal Record-keeping requirements

Resource Conservation and Recovery Act (RCRA)

- RCRA Subtitle C regulates the generation, transportation, treatment, storage, and disposal of “hazardous waste”
- RCRA Subtitle D regulates management of “solid” waste

Solid Waste Under RCRA

- “Solid Waste” is “any discarded material”
 - Includes solids, liquids, gases
- “Discarded Material” is any material that is abandoned, recycled, or considered inherently waste-like

Typical Solid Wastes

- Garbage (e.g., egg shells, coffee grounds)
- Refuse (e.g., metal scrap, sheet rock)
- Sludges from waste-treatment plants

Exemptions from Solid Waste Regulation

- Twenty-two specific exclusions from regulation as solid waste, including:
 - Domestic sewage
 - Point source discharges regulated under Clean Water Act (NPDES)
 - Irrigation return flows
 - Materials subjected to *in situ* mining

Hazardous Wastes Under RCRA

- “Hazardous Waste” is a subset of solid waste
 - All hazardous wastes are solid wastes
 - Not all solid wastes are hazardous wastes

Categories of Hazardous Wastes

- Listed Wastes
- Characteristic Wastes

Listed Wastes

- Four different lists of specific industrial waste streams
 - F list (Wastes from non-specific sources)
 - K list (Known wastes from specific sources)
 - P & U lists (Hazardous pure or commercial grade formulations of specific unused chemicals)

Characteristic Wastes

- Ignitable;
- Corrosive;
- Reactive; or
- Toxic

Exemptions from Hazardous Waste Regulation (Still Regulated as Solid Waste)

- Eighteen different categories, including:
 - Household Waste
 - Mining overburden returned to the mine site
 - Oil & Gas exploration and production wastes
 - Solid waste from the extraction beneficiation, and processing of ores and minerals (i.e., “Bevill” wastes)

The Bevill Exemption

- 1980 - Congress exempted from regulation as hazardous waste “mining and mineral processing wastes generated by extraction, beneficiation, and processing activities”
 - Twenty specific mineral processing wastes exempted
 - All extraction and beneficiation wastes exempted

Uniquely Associated Wastes

- Only wastes that are “uniquely associated” with extraction and beneficiation of ores and minerals (plus 20 listed processing wastes) are exempt
- Wastes from ancillary operations not exempt
- Non-uniquely associated wastes include used oil, PCBs, discarded commercial chemicals, cleaning solvents, filters, empty drums, lab wastes, and general refuse

How Can You Lose the Bevill Exemption?

- Engage in mineral processing (as opposed to beneficiation) operations
 - Acid digestion, chlorination, smelting
- Mix non-Bevill-exempt waste with Bevill-exempt waste (i.e., co-disposal)

Beneficiation vs. Mineral Processing

Beneficiation Operations

crushing, grinding, washing dissolution, crystallization, filtration, sorting, sizing, drying, sintering, pelletizing, briquetting, calcining to remove water and/or carbon dioxide, roasting in preparation for leaching (except where the roasting/leaching sequence produces a final or intermediate product that does not undergo further beneficiation or processing), gravity concentration, magnetic separation, electrostatic separation, flotation, ion exchange, solvent extraction, electrowinning, precipitation, amalgamation, and heap, dump, vat, tank, and *in situ* leaching

Beneficiation Operations

- Beneficiation Operations
 - Generate high volume solid waste streams that are essentially earthen in character
 - After removal of valuable constituents, remaining material is physically and chemically similar to ore entering process
 - May be finer-grained

Beneficiation Operations

- Separate and concentrate the mineral values from waste material, remove impurities, or prepare the ore for further refinement
- No change in mineral values other than by reducing (e.g., crushing or grinding), or enlarging (e.g., pelletizing or briquetting) the particle size to facilitate processing
- A chemical change in the mineral value typically does not occur
- Use feedstocks that are less than 50% scrap materials

Mineral Processing

- Generally follow beneficiation and change the concentrated mineral value into a more useful chemical form
- Commonly done by heat (e.g., smelting) or chemical reactions (e.g., acid digestion, chlorination) to change the chemical composition of the mineral

Mineral Processing

- Often destroys the physical and chemical structure of the incoming ore or mineral feedstock
- Generate waste streams that bear little resemblance to original material
 - i.e., produce waste streams that are not earthen in character

Mineral Processing

- All operations downstream of processing operations are considered processing, regardless of whether they involve steps specifically identified as beneficiation operations
 - i.e., floatation or grinding following digestion are considered processing

Is your waste Bevill-exempt?

- Determine whether the material is considered a “solid waste” under RCRA
- Determine whether facility is using a primary ore or mineral to produce a final or intermediate product and also whether 50 percent of the feedstocks are from secondary sources

Is your waste Bevill-exempt?

- Establish whether the material and the operation that generates it are uniquely associated with mineral production
- Determine where in the sequence of operations beneficiation ends and mineral processing begins (if it does)
- If processing, is it one of the 20 specific exemptions?

Mixing of Wastes

- The other way (besides engaging in mineral processing) to lose the Bevill exemption

The Mixture Rule

- If any amount of a *listed* waste is mixed with any amount of non-hazardous waste, the resulting mixture is a listed hazardous waste
- A mixture of a *characteristic* waste and a non-hazardous waste is hazardous only if the mixture exhibits a characteristic, unless the characteristic imparted to the mixture is from an exempt waste (such as Bevill)

Example

Bevill Waste
Characteristic for
Lead

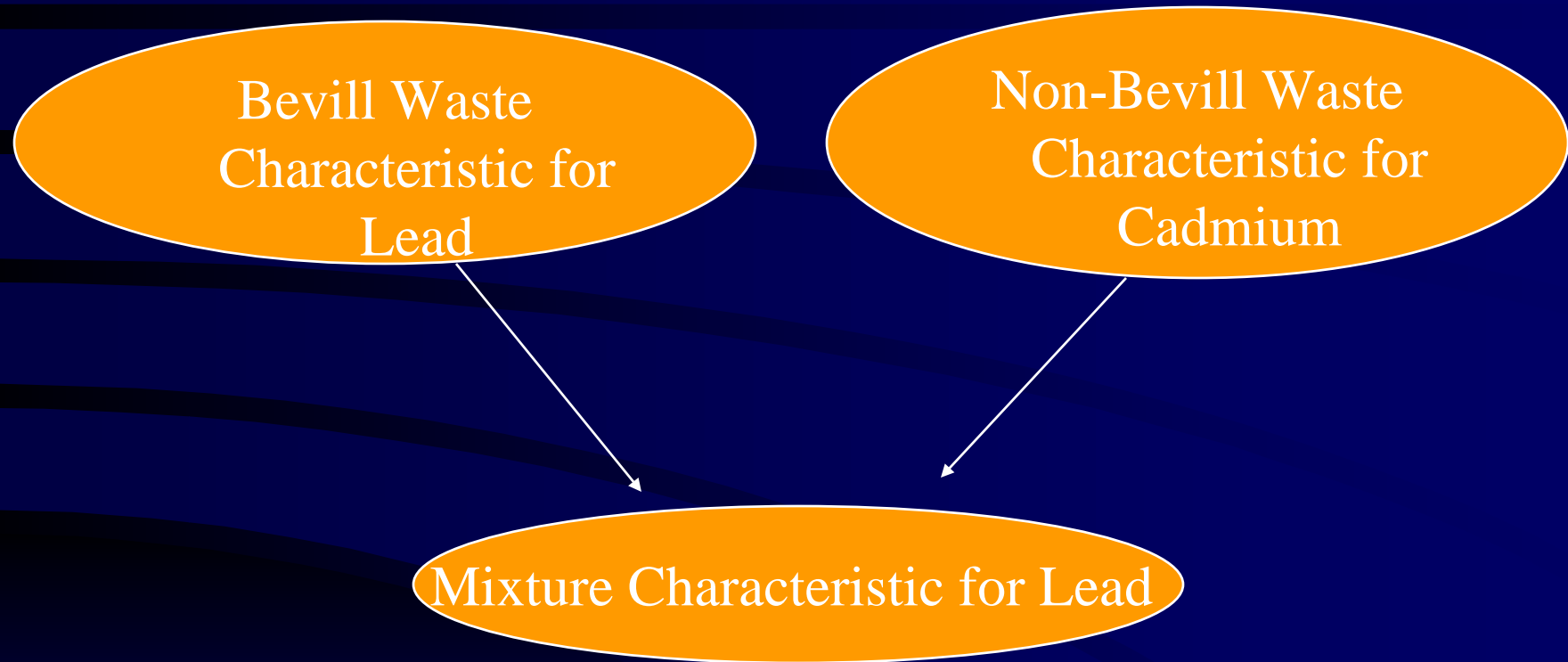
Non-Bevill Waste
Characteristic for
Cadmium

Mixture Characteristic for Lead
and Cadmium



Mixture is regulated as Hazardous Waste

Example



Hazards of Mixing Wastes

- Mixing a hazardous waste with Bevill-exempt waste to render it non-hazardous meets the definition of treatment
 - Treatment requires RCRA permit
- Mixing may be form of impermissible dilution
- Land Disposal Restrictions may still apply

How do you establish that your
waste is Bevill-exempt?

Establishing Bevill Status

- Try to resolve the issue on a site-specific factual (as opposed to legal) basis
 - Conduct a detailed analysis of current or historic operations
 - Show that they involve(d) either specific operations identified as beneficiation or that the waste stream from the process is similar to the original material that entered the process (i.e., it is earthen-like)
- If possible, establish that waste from ancillary operations was/is not mixed with waste from primary operations

How do you maintain the Bevill exemption?

- Consider the impact of any proposed process change (i.e., hot-acid leaching) on the Bevill status of your waste stream before implementing the new process
- Do not mix hazardous waste (i.e., ancillary wastes) with Bevill-exempt waste

Limits of Bevill Protection

- The Bevill exclusion applies only to RCRA hazardous waste regulation
 - It does not provide protection from CERCLA (Superfund) liability
- EPA can bring enforcement action under RCRA § 7003 where treatment, storage, or disposal of any *solid waste* or hazardous waste *may present* imminent and substantial endangerment to health or the environment.

Conclusion

- Know the rules
- Know how the rules apply to your processes

Dean Miller
Davis Graham & Stubbs LLP
1550 17th Street, Suite 500
Denver, CO 80202
303-892-7389
dean.miller@dgsllaw.com
www.dgsllaw.com



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