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Recycling and Beneficial Reuse of Boiler Slag Potential Impact of Further Regulation

Boiler Slag Industry Representatives

At the Office of Management and Budget
Washington, D.C.

November 12, 2009

Boiler Slag Industry

Background and History

- 8 different categories of CCB (Coal Combustion Byproduct)
- Boiler slag is the smallest category based on volume (1.5M-2M out of 136M)
- Historically the highest percentage of reuse – virtually 100%
 - No storage (long term)
 - No impoundments
- Recycling of boiler slag began 70 years ago in Gary, IN (H.B. Reed)
- Today the industry is comprised of 8 companies, 27 plants, 400+ employees
- \$200,000,000 industry directly affecting over 10,000 small businesses and thousands of people

Beneficial Reuse - Recycling

- Abrasive Blasting
 - Cleanest
 - Safest
 - Cost effective
 - Approved by U.S. Navy (QPL)
 - Approved by CARB
- Roofing Granules
 - Headlap and backsurfacing
 - Shadow line and face granules
 - Industrial and commercial roofing
 - 80% of all residential roofing shingles in the U.S. contain boiler (coal) slag
- Skid / Ice Control
 - State and County highway departments

Beneficial Reuse - Recycling

(continued)

- Glass Bottle Manufacturing
- Water Filtration
- Anti Skid Tape and Strips
- Mineral Filler
- Seal Coating
- Cement Kiln Feedstock
- New uses and applications under development

All of the above uses collectively lead to virtually 100% recycling of boiler slag.

This means immediate use, no long term storage, no impoundments.

Technical Data

- Appearance
 - Black angular particles
 - Smooth and glassy surface
- Vitrified Material
 - Inert
 - Mohs Hardness of 6+
 - Very low leachability
- Primary Components
 - Silica, aluminum, iron (60-90% of total composition)
- Calcium, Magnesium, Sodium, Potassium, Titanium, Sulfate, and small amounts of other metals
- Not a Characteristically Hazardous Waste
 - Ignitability
 - Corrosivity
 - Reactivity
 - Toxicity - passes TCLP

Technical Data

(continued)

- No known information exists to support classification of boiler slag as a Listed Hazardous Waste
- CCB's in general pose much less risk to public health and environment than Municipal Solid Waste
- No documented case of an adverse environmental impact from boiler slag

Impact to Boiler Slag of Further Regulation

- Minimize or eliminate historical levels of beneficial reuse
 - Many states strictly prohibit beneficial reuse of materials classified as hazardous waste
 - Stigma and liability, particularly in the residential shingle market
 - Increased disposal costs – prohibitive to continue recycling
 - Increased Greenhouse Gas Emissions
 - Increased landfilling and need for landfill space
 - Increased need to mine virgin materials

Impact to Boiler Slag of Further Regulation - continued

- Residential Roofing
 - \$9 Billion Market
 - Asphalt Shingles make up approximately 80% of the total market and 80% of asphalt shingles contain Boiler Slag
 - Average cost of a typical roof \$8,000 with asphalt shingles
 - Other options (tile, slate, wood) range from \$12,000 to \$27,000
 - Headlap Granules represent 5-7% of the cost of the shingle
 - Cost increase of \$500 to \$1000 per roof without Boiler Slag Granule availability

Impact to Boiler Slag of Further Regulation - continued

- Surface Preparation and Abrasive Markets
 - Coal Slag is the abrasive of choice for many public works projects (highway bridges, water tanks, lock and dam)
 - Specified by U.S. Navy, Coast Guard, Army Corps of Engineers
 - Used extensively in the private sector
 - Issues vary with alternatives from environmental and health & safety concerns to a significant increase in costs
 - Alternative abrasive costs can range from 15% to 300% higher than Coal Slag abrasives

Impact to Boiler Slag of Further Regulation - continued

- Significant increase in management and disposal costs
 - Hazardous waste disposal and transportation costs are up to 500% higher than Non Hazardous waste
 - Additional costs for profiling, employee training, licensing and administration
 - Increased costs would be prohibitive to boiler slag recycling for both the roofing and abrasives industries

Summary / Conclusion

- Boiler slag is not managed and stored in impoundments
- Historically high levels of reuse
 - Market demand exceeds boiler slag supply
 - Reclamation of historical stockpiles to meet demand
- Does not meet criteria set forth for hazardous waste
- Significant negative impact should further regulation occur
 - Internal Economic Loss
 - Job Loss due to Import Substitutes
 - Increased Freight Costs
 - Increased Disposal Costs
 - Total Economic Impact Estimated at ~\$1 Billion
- Reuse and Recycling of Boiler Slag conserves natural resources, reduces greenhouse gases, and is economically and environmentally friendly
- Boiler Slag is unique in the way it is generated, managed, and recycled and reused.
- The Science and Economics do not justify further Regulation