

# Solid Waste Minimization

## *Difficult to Handle Materials*

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# RPF Environmental

## TESTING & CONSULTING SERVICES



RPF Environmental is a full-service Environmental Health and Safety company:

- Indoor Air Quality & Mold Concerns
- Asbestos Management
- Worker Exposure Analyses- Noise & Chemicals
- Safety Training & Audits
- Written Safety Programs
- Among other EHS services



# Goals & Challenges

- 1) Minimizing Hazardous Materials
- 2) Improving Circularity
- 3) Addressing Landfill Pressure
- 4) Evolving Trends & EHS Aspects

# What makes something recyclable?



Material  
Composition



Collection and  
Logistics



Market Demand  
and Economic  
Viability



Chemical  
Intensity and  
Process

# Four challenge areas for construction sustainability



Hazardous  
Building  
Materials and  
impacts on  
sustainability



Keys for optimizing  
construction waste  
management for  
other difficult to  
handle materials

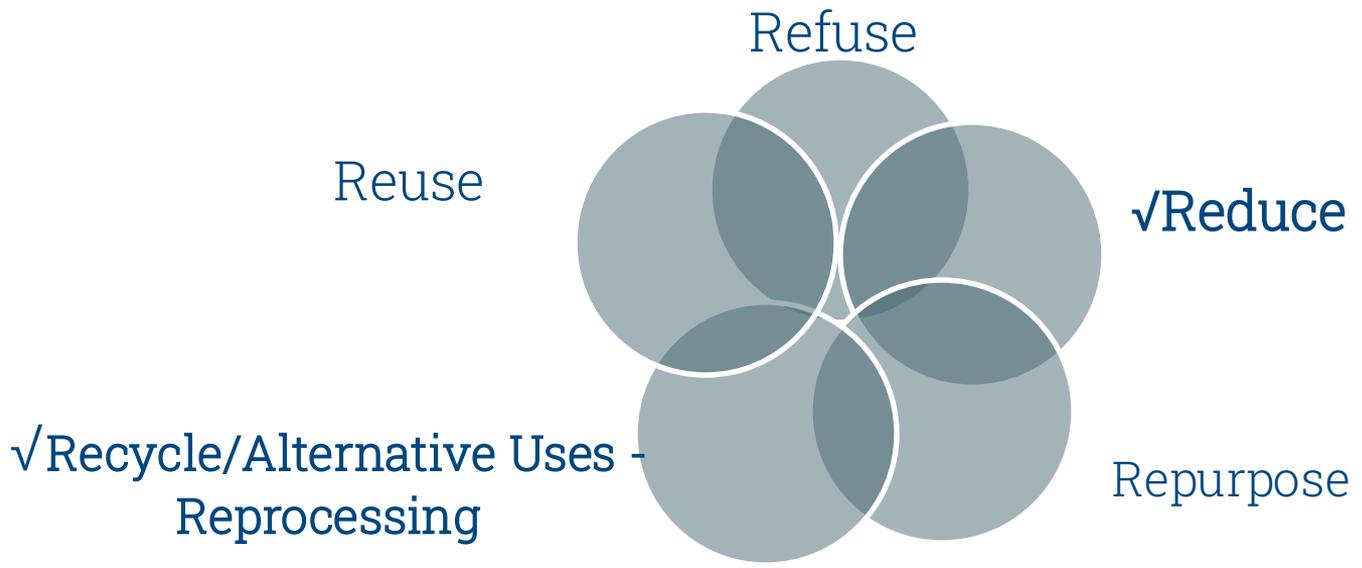


Planning for landfill  
constraint and  
LF avoidance  
goals/requirements



Evolving  
Trends

# 5 R's & What Can We Do with these types of materials?





# Balancing Act

## Quantity

## Quality

## Logistics

## Markets

- Segregating, handling, pre-processing and logistics to final locations
- Alternative Use technologies can be very specific and have high quality specifications
- And ... we just don't want some things to fall apart too easily ...



## Earth Rated Dog Poop Bags, Refill Rolls, Lavender Scented, 270 count

By [Earth Rated](#)

4.8  [7694 Ratings](#) [15 Answered Questions](#)

Count: **Scented, 270 count**

Scented, 120 count  
\$0.07/ea

Unscented, 120 count  
\$0.07/ea

Scented, 270 count  
\$0.06/ea

Unscented, 270 count  
\$0.06/ea

Scented, 600 count  
\$0.05/ea

Unscented, 600 count  
\$0.05/ea

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# The Legacy – Hazardous Building Materials

When are they a problem?

- ❖ Confidence - be sure of the “negative” and control for “overestimating the positive”
  - ❖ Project sequencing can be like “peeling an onion” be ready to update findings as demolition & deconstruction proceeds



# The Legacy – Hazardous Building Materials



- Regulatory applicability
- Cost – Benefit of remedial and disposal resources
- Perception, Operations & Maintenance
- Get the characterization right and the wastes to a minimum

# Asbestos – Minimization Opportunities

- Limited – “no safe limit” & adds volume (and embedded energy) through secondary materials (poly)
- Options and regulatory structure exist to manage “in place” but not commonly considered in renovation work – no cut off dates
- Improve inspection/assessment to improve certainty that material streams contain asbestos, rather than using “presumptions”



**2000 square feet of poly at 60 pounds**

Cost before “carbon”

\$130

Cost after “carbon”

>\$260\*

\*Various sources estimates

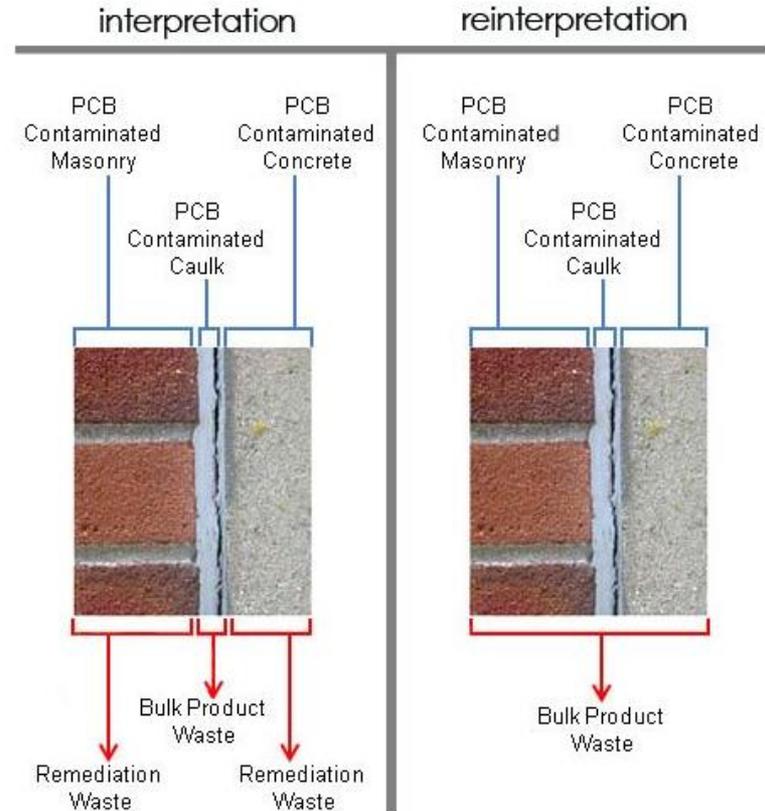
# Lead – Minimization Opportunities

- Limited – better than Asbestos/PCBs
- General demolition and Lead Based Paint (LBP) components
- Consequence – still lead
- Selective deconstruction – doesn't have to be lead abatement; allowances for worker protection and process control – minimize the regulated stream
- Advantages – potential to recover / reuse architectural/dimensional materials
- Improvement – chemical coating removal



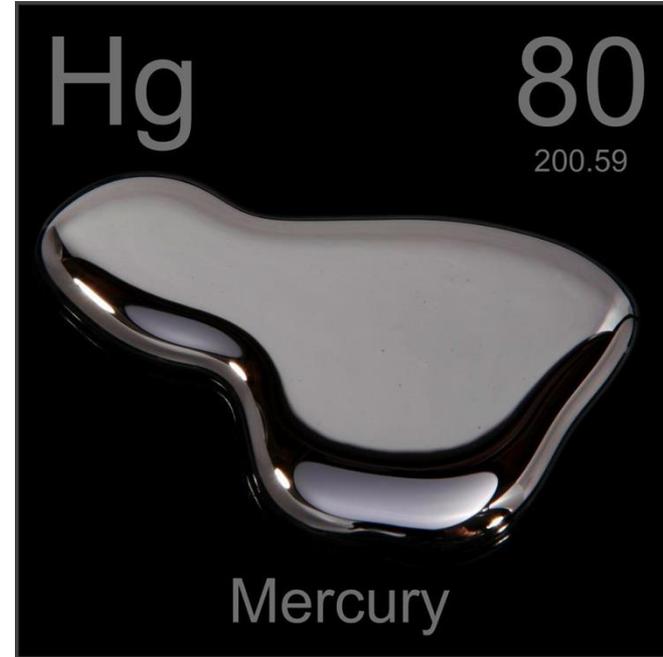
# PCBs – Minimization Opportunities

- Limited – what level of confidence?
- Thin line between waste differentiators (PCB Bulk Product vs PCB Remediation )
- Reinterpretation – improved handling and greater efficacy in project flows.
- Often commingled with other HBM (asbestos/lead)



# Mercury

- Blessedly less common in paints and coatings
- Mostly found in switches, lighting systems
- Purpose specific



# PFAS?

ENERGY + ENVIRONMENT

## THE BULLETIN BOARD

# Saint-Gobain completes demolition of Merrimack facility embroiled in PFAS pollution scandal

BY: WILLIAM SKIPWORTH - JULY 3, 2025 1:02 PM



- Evolving regulatory structure
- Potential for dramatic impacts on material stream identification/characterization/disposal

# PLASTIC RECYCLING CHART

1	2	3	4	5	6	7
PET	HDPE	PVC	LDPE	PP	PS	OTHER
POLYETHYLENE TEREPHTHALATE	HIGH DENSITY POLYETHYLENE	POLYVINYL CHLORIDE	LOW DENSITY POLYETHYLENE	POLYPROPYLENE	POLYSTYRENE	OTHER PC POLYCARBONATE
COSMETIC CONTAINERS FOOD JARS JELLY AND JAM CONTAINERS MOUTHWASH BOTTLES PEANUT BUTTER CONTAINERS PLASTIC BOTTLES PREPARED FOOD TRAYS SALAD DRESSING BOTTLES SINGLE USE WATER BOTTLES SOFT DRINK BOTTLES SPORT DRINK BOTTLES	AGRICULTURAL PIPE DETERGENT BOTTLES EXTRUDED PIPE GROCERY BAGS ICE CREAM TUBS MILK JUGS JUICE JUGS OIL VINEGAR BOTTLES PAIS PLAYGROUND EQUIPMENT SHAMPOO BOTTLES SHIPPING CONTAINERS	BLISTER PACKS BLOOD BAGS CABLE SHEATHING CARPET BACKING FLOOR TILES GARDEN HOSE MEAT WRAP MEDICAL TUBING OUTDOOR FURNITURE PLUMBING PIPE WINDOW FRAMES WIRE INSULATION	6-PACK RINGS BREAD BAGS DRY CLEANING BAGS GARBAGE BAGS HEAVY DUTY BAGS MOLDED LABORATORY EQUIPMENT PLASTIC FOOD WRAP RECYCLABLE BOTTLES TOYS	BOTTLE CAPS CEREAL LINERS COTTAGE CHEESE CONTAINERS HINGED LUNCH BOXES KETCHUP BOTTLES MARGARINE CONTAINERS MEDICINE BOTTLES MICROWAVE OVENWARE PACKING TAPE POTATO CHIP BAGS RUBBERMAID CONTAINERS STRAWS	CAFETERIA TRAYS CD AND VIDEO CASES DISPOSABLE HOT OR COLD DRINK CUPS & PAPER PLATES DRINKING GLASSES EGG CARTONS FAST FOOD CLAMSHELLS FOAM PACKING HINGED BAKERY CONTAINERS PACKING PEANUTS PLASTIC CUTLERY STYROFOAM TOYS YOGURT CONTAINERS	BABY BOTTLES CAR PARTS FIBERGLASS LARGE WATER BOTTLES NALGENE BOTTLES SIPPY CUPS TUFFERWARE WATER COOLER BOTTLES

# Improving Circularity for “Harder to Recycle” Material Streams

- What are “hard to recycle” materials? Carpets, mixed streams of foams, films, cardboard, wood scrap – often in same containers
- Various estimates on total tons recycled vs wasted; smaller projects can have higher waste rates
- Have a plan – what materials, how much, avoid accumulation – Disney goal is 90% diversion in construction projects



## “National Sword”

Understand end market/user specifications for contamination/material stream conformance – there are quality standards – these bales were formerly “recycled” ... somewhere else, but can be co-processed for cement

# What level of “pre-processing” or on-site management is needed?

## EPS Compactor



# What do we do with this stuff?



# Other Options

➤ On-site shredding and compaction

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➤ Adopt a “supplier” mindset – quality in the product





# Prevention Through Design & Sustainability

Wastage rates can be reduced using this methodology & improve safety

ASSP ANSI Z590.3 – Prevention Through Design Standard

CDC NIOSH – Prevention through Design

# Landfills

ENERGY + ENVIRONMENT

## New surcharge on solid waste in New Hampshire to take effect in January

BY: WILLIAM SKIPWORTH - AUGUST 13, 2025 5:00 AM



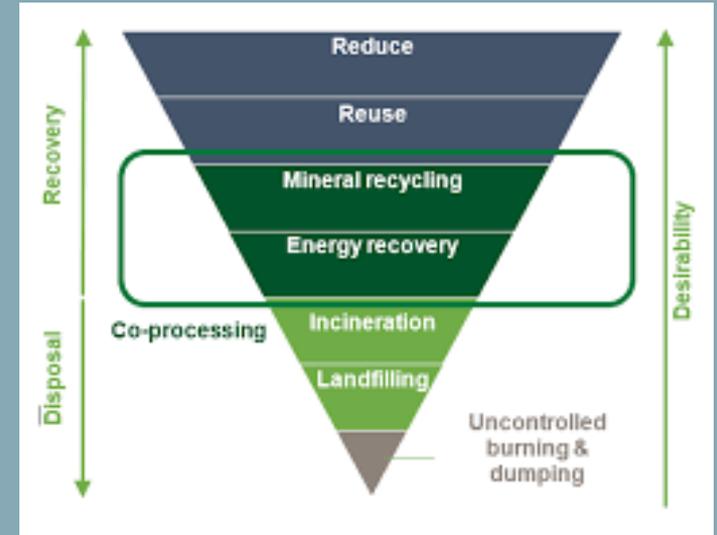
- NH – is a “net importer”
- Seasonal and growing residential/MSW increase pressure
- Landfilling “cheapest” endpoint most of the time – though this can change
- Landfill Bans – NH just developing

# Other Options

- Economic, technology and logistical constraints
- Florida Recycles – Recovered Materials Rule
- Cement Co-Processing avoids both fossil fuel use and native materials extraction
- Energy Values - Engineered Municipal Solid Waste Fuel Streams – USEPA NHSM
- Reverse logistics driven by sustainability goals
- Higher costs for disposal = opportunity



# CONSIDER PARTNERSHIPS WITH CO-PROCESSORS



# NonHazardous Secondary Materials (NHSM) 40 CFR

See this guide: <https://www.epa.gov/sites/default/files/>

## Definition of NHSM

NHSM are non-hazardous by-products from manufacturing and commercial processes.

## Regulatory Framework

EPA regulates NHSM under CFR Part 241 as part of the Resource Conservation and Recovery Act.

## Impact on Combustion Units

NHSM classification determines if combustion units follow CAA Section 129 or Section 112 rules.

## Importance of Correct Classification

Accurate NHSM classification prevents CAA permit violations and ensures environmental protection.





# Types of NHSM & Solid Waste Determination

## **Definition and Examples of NHSM**

NHSM includes materials like construction wood, biosolids, and poultry litter not from primary manufacturing.

## **EPA Guidance on Clean Materials**

Clean paper and plastics like office paper, cardboard, and plastic scrap are recognized NHSM types.

## **Solid Waste Definition and Discard Concept**

Solid waste includes discarded materials from various activities; discard means thrown away or abandoned.

## **Regulatory Importance of Classification**

Proper classification of materials affects Clean Air Act compliance and combustion regulations.



# Making a Non-Waste Determination

## **Fuel Type Determination**

Identify if material is traditional fuel or clean cellulosic biomass for initial classification.

## **Categorical Non-Waste Check**

Verify if material is listed as categorical non-waste fuel under regulatory codes.

## **Material Management Control**

Assess whether material is managed within generator's control to ensure proper handling.

## **Processing and Legitimacy Criteria**

Ensure material is processed to remove contaminants and meets legitimacy criteria for fuel use.

# Criteria for NHSM to Qualify as Non-Waste

## **Commodity Management**

NHSM must be managed like a valuable fuel commodity with proper storage and containment.

## **Heating Value Requirement**

NHSM needs a heating value of at least 5,000 Btu/lb or proven energy recovery cost-effectiveness.

## **Contaminant Level Standards**

Contaminant levels in NHSM must be comparable or lower than traditional fuels to ensure safe combustion.



# EPA Petition Options for Non-Waste Determination



## **Site-Specific Petition Process**

Facilities submit petitions under 40 CFR 241.3(c) to EPA regional or OLEM officials.

## **Categorical Petition Process**

Nationwide petition under 40 CFR 241.4(b) involves notice-and-comment rulemaking.

## **Legitimacy Criteria Importance**

Petitions must prove materials meet legitimacy criteria and resemble traditional fuels.

## **Regulatory Compliance and Safety**

Detailed documentation ensures compliance and protects environmental safety.

# Action Plan

- 1) Control contamination (dirt, batteries, organics, mixed materials, difficult to process materials)
- 2) Provide for site logistics and material stream integrity – organized area, clear markings
- 3) Track generation
- 4) Train teams to maintain integrity and quality control
- 5) Look for aggregators and reverse logistics opportunities – have enough to make it worthwhile

# Conclusion

1. Technologies and markets— new opportunities
2. Keep looking at waste minimization & “management in place” strategies for certain material classes – can we enclose, contain or encapsulate
3. Learn about aggregators and markets outside the Northeast
4. Evaluate streams of materials that may have higher market values, including foams, films and strapping.
5. Keep working with local partners for solutions
6. Plan for solid waste handling in new construction – how will it be handled?



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