

# Recycling Shingles into Roads



## *U.S. EPA's Perspective*

Missouri Showcase  
September 22-23, 2008

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U.S. EPA Region 5 -  
Chicago



# U.S. EPA Promotes Recycling

## Resource Conservation Challenge

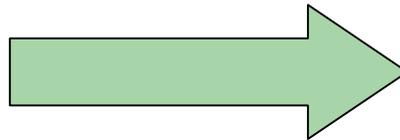
1. Municipal Solid Waste Recycling
2. **Industrial Materials Recycling**
  - a. Coal combustion products
  - b. Foundry sands
  - c. **Construction & demolition materials**
3. Reductions of 31 Priority & Toxic Chemicals
4. Greening of Electronics



[www.epa.gov/rcc](http://www.epa.gov/rcc)

# Recycling: an Integral Part of Sustainable Materials Management

traditional  
“waste management”  
approach



“materials  
management”  
philosophy



# Benefits of Recycling

1. Local, industrial materials are often an **economical choice** that can offer **enhanced engineering performance**
2. Recycling reduces need to extract and process natural resources
  - **Saves energy** and water
  - **Reduces greenhouse gas emissions**





# Benefits of Using RAS in HMA

Avoided Impacts	per 1 ton RAS in HMA
<b>ENERGY USE</b>	672,399 Btu
<b>WATER USE</b>	20 gallons
<b>GHG EMISSIONS</b>	
CO2	0.14 tons
<b>AIR EMISSIONS</b>	
CO	0.10 kg
NO2	0.54 kg
SO2	0.24 kg

emissions from **14.4 gallons of gasoline** consumed

# The Numbers

- Estimated 11 million tons (or more!) tear-offs generated annually in U.S.
- Very little is recycled
- Shingles are ~ 20% - 35% asphalt cement
  - At 20% liquid AC @ \$500/ton AC...  
\$1.1B worth of AC available annually



# www.shinglerecycling.org

## Learn More



STATE EXPERIENCE



ECONOMICS



MARKETS



ENVIRONMENTAL  
REGULATIONS



WORKER HEALTH AND  
SAFETY



LITERATURE



CURRENT RESEARCH



SITE MAP



LINKS



# 3RD ASPHALT SHINGLE RECYCLING FORUM



November 1 & 2, 2007  
Ralph Metcalfe Federal Building  
Chicago, Illinois



## EXPANDING MARKETS & ADVANCING TECHNOLOGY

**Hosted by:**

United States Environmental Protection Agency  
Federal Highway Administration  
Construction Materials Recycling Association

# How can I recycle shingles?



# Environmental Issues



**REPORT:**

***Environmental Issues Associated  
With Asphalt Shingle Recycling***

Prepared for:

Construction Materials Recycling Association  
Asphalt Shingle Recycling Project  
US EPA Innovations Workgroup

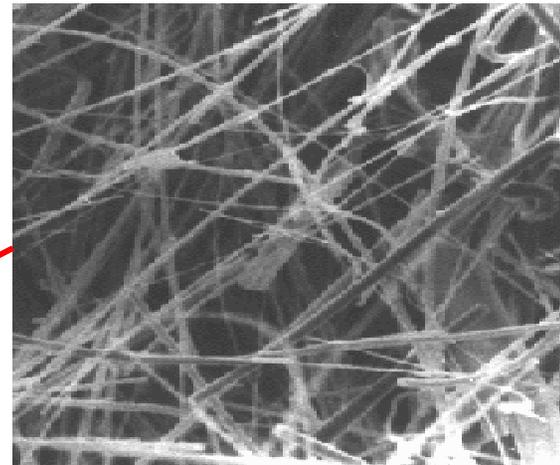
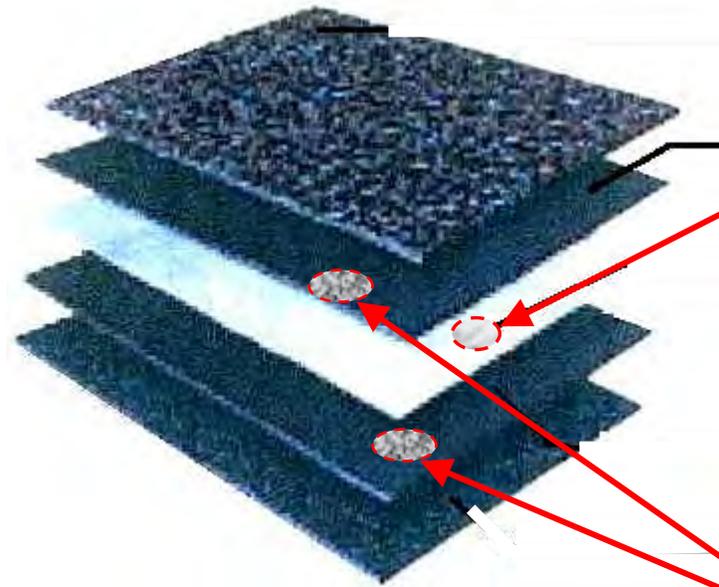
Prepared by:

Innovative Waste Consulting Services, LLC  
Gainesville, Florida

Authors: Timothy Townsend, Ph.D., P.E., Jon Powell,  
E.I., Chad Xu, Ph.D.

October 19, 2007

# Constituents of Concern

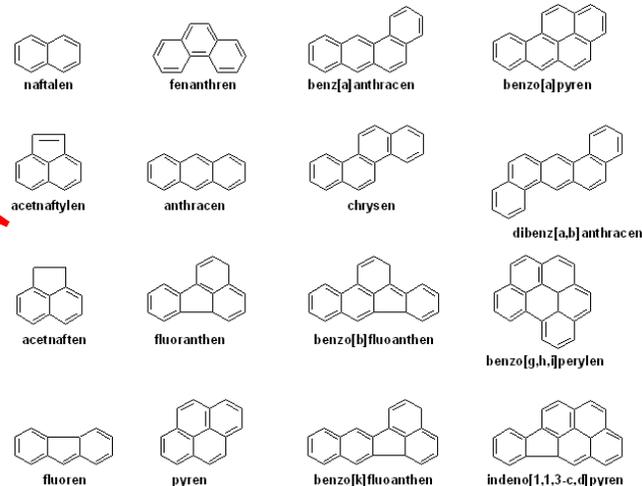


## ASBESTOS

Base  
(fiberglass or  
organic felt)

## PAHs

Waterproofing asphalt



# Report's asbestos summary:



- Asbestos was phased out of asphalt shingles by the early 1980s.
- Of 27,000 samples tested, asbestos was detected in 1.5%.
  - Many detections attributed to other materials (e.g., mastic) attached to samples.
  - Consistent with the fact that asbestos was mostly phased out in the 1970s, typical reported service life for asphalt shingles is 15-25 years
- Obtaining/sourcing uncontaminated material should further reduce incidence of asbestos in samples

# Report's PAHs summary:



- Shingles & asphalt naturally contain PAHs.
- Discarded asphalt shingles don't readily leach PAHs.
  - Additional testing required to detect PAHs at new, lower acceptable limits
- PAHs are emitted during normal HMA production
  - Pollution control equipment reduces PAH concentrations
  - Effect of adding shingles is unknown
    - A study in Texas will investigate this issue.

# Report's recommendations



- Paper contains authors' recommendations to both facilities and regulatory agencies for minimizing environmental risks and worker health risks
  - Operations plan
  - Monitoring and QA plan
  - End-use plan

# Market Challenges

- Tear-offs need to be carefully sorted
- No widespread infrastructure
- Not all HMA plants are interested
- **Specifications are needed!!**
  - **even for non-road applications in some states**



# Final Thought



***In short: using industrial materials can make the economy more efficient while maintaining protection of human health and the environment.***



# Resources

- [www.ShingleRecycling.org](http://www.ShingleRecycling.org)
- USEPA's National Industrial Materials Recycling Website
  - <http://www.epa.gov/epaoswer/non-hw/imr/index.htm>
- FHWA User Guidelines for Waste & Byproduct Materials in Pavement Construction
  - <http://www.tfhrc.gov/hnr20/recycle/waste/begin.htm>





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