

# Asphalt Shingle Recycling and Asbestos

- Concern
- Regulation
- Sampling
- Approval

*Second Asphalt Shingles Recycling Forum  
April 2003*

# Asphalt Shingle Recycling Assessment Project

- Forum (1999)
- State, Industry Survey (2001)
  - Regulatory approach
  - Sampling data
  - R&D projects
- Develop web page
  - [www.shinglerecycling.org](http://www.shinglerecycling.org)

# Asbestos Concern

- Removal
- Processing
  - Incoming material sampling
  - Emissions during grinding
- End Use
  - Exposure

# Concern = Regulation

- Occupational exposure
  - OSHA Standard 1910.1001, 1926.1101
  - PEL (f/cc over TWA 8hrs)
- Airborne emission & inhalation (asbestosis)
  - NESHAP (40 CFR Part 61)
    - ACWM (any asbestos content)
    - ACM (> 1% asbestos content)
    - RACM
    - Friable v. non-friable

# Types of Asbestos

Chrysotile \*

Amosite

Crocidolite

Anthophyllite

Tremolite

Actinolite

- Identify based on color, elongation, morphology (structure & shape), birefringence (light)

# Regulation

- NESHAP
  - Detailed procedures for collection, processing, packaging and transport (61.150)
  - “No construct or maintain roadway using ACWM” (61.143)
- Guide to Normal Demolition Practices
  - Handling ACWM during demolition, renovation and disposal
  - “Asbestos containing roofing material may not be ground up for recycling into other products”

# Sampling

- Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116, July 1993)
  - Sample collection, handling, processing
  - Preparation
  - Laboratory Analysis
    - Polarized Light Microscopy (PLM)
    - Transmission Electron Microscopy (TEM)

# PLM Method “101”

- Take a 3-4 in<sup>2</sup> sample from multiple layers
- Clean, homogenize (under a hood)
  - Dissolve in solvent, Ash or Chemical Acid
- Look at under microscope
  - Bright light through 2 polarizing filters
- Compare w/ known asbestos fibers
- Limitations (false +’s and –’s)
  - TEM much more accurate, expensive

# Sampling

- **ASTM**
  - D4687 General planning for waste sampling
  - D6051-96 Composite sampling & field sub-sampling
  - D6044-96 Representative sampling
  - D6009-96 Sampling waste piles
- **NIST**
  - **Directory of Accredited Laboratories**
    - Both PLM & TEM methods

# Where is the Asbestos ?

- 1990 EPA notice identifying products
  - built-up roofing, single ply membrane systems, shingles, underlayment felts, coatings, caulks, mastics, base flashings
- Manufacturers
  - Fiber mat of 3 tabs ('63 - mid '70s)
    - much less than 1%
  - Not much help, liability/litigation concern
  - Imports ?

# Data

- Iowa (1791), no hits\*
- Maine (118), no hits
- Mass (2288 composites), 11 hits  $< 1\%$ , 1 - 2%
  - 69 tarpaper (2  $< 5\%$ , 2  $< 1\%$ ), 109 grind (2  $< 1\%$ )
- Florida (287), 2 hits  $> 1\%$ 
  - 17 grind
- Missouri (6), no hits
- Hawaii (100), 1 hit  $> 1\%$
- Minnesota (156), no hits
- Minnesota (50 tarpaper), 1 hit - 2-5%
- We still want more data !
  - PLM & TEM correlation, Hits

# Regulatory Approval

- **Beneficial Use Determinations (BUDs)**
  - Formal, Informal, Discretionary programs
    - IL,IN,LA,ME,MI,NJ,NY,NC,OH,PA,TX,WV,WI
  - Basis
    - Characteristics
    - Reuse application
    - Combination of source & application
  - Allowable uses
  - Constituent concentration thresholds
  - Risk standards
  - Sampling & testing requirements (QA/QC)

# Minnesota Approach

- Regulatory status under NESHAP

Single family

VS

Commercial & Institutional

- *Overcoming the Barriers to Asphalt Shingle Recycling, Environmental White Paper Report, MnDOT, 2002*

# Strategy

- Identify players
  - State, county, municipal (see web)
  - Waste, toxics, air, water, health, building, zoning, DOT
- Pre-meeting (existing screening program?)
  - Present idea, request input & discuss
  - Offer data, follow-up information
  - Determine approvals, permits, process, timeline
  - Identify unknowns
  - Request demonstration project

# Model Sampling Protocol

- Visual Screening
  - Layers, composite, thick
- Specified Frequency
  - Incoming loads
- Grind
  - Per job
- Relationship w/ haulers, end markets
  - Contract, agreement, awareness, certify

# Permits

- Regulations
  - Evolved in response to problems, liability
    - Odors, run-off, gas, fires, failures
    - Contamination (ground & surface water)
  - Open regulatory development process
- Permits
  - Conformance to regulations
  - Fees
  - Compliance monitoring
  - Renewal

# Coordinating w/ DOT

- User Guidelines for Waste and Byproduct Materials in Pavement Construction
  - <http://www.tfhrc.gov/hnr20/recycle/waste/begin.htm>
- Innovative state programs
  - TX, NC, PA, MA
    - <http://www.tfhrc.gov/hnr20/recycle/pubs.htm>

# Resources

- CMRA
  - <http://www.cdrecycling.org>
  - <http://www/shinglerecycling.org>
- NRCA
  - <http://www.nrca.net>
- Recycled Materials Resource Center
  - <http://www.rmrc.unh.edu>
- FHWA
  - <http://www.fhwa.dot.gov>
  - <http://www.tfhrc.gov/hnr20/recycle>
- EPA
  - <http://www.epa.gov/jtr>

# Thank You

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