California’s ATCM to Reduce Formaldehyde Emissions from Composite Wood Products

Kitchen Cabinet Manufacturers Association
52nd Annual Conference
Olympic Valley, California

Jim Aguila
California Air Resources Board

June 4, 2007
Outline

- Background
- Available Technologies
- Approved Airborne Toxic Control Measure
- Benefits and Impacts
- April ARB Hearing Summary
- 2007 Schedule
Background
California's Air Toxics Program

Identification

- Potential Toxic Substance
- ARB/OEHHA Publishes Draft Report
  - Public Workshops
  - Comment Periods
- SRP Reviews Report
- Public Hearing

Risk Management

- Evaluates Source Categories
- Investigate Risk Reduction Options
  - Public Workshops
- Publish Staff Report/Proposal
  - Public Workshops
  - Comment Period
- Public Hearing
Formaldehyde as a Toxic Air Contaminant

• Identified as a Toxic Air Contaminant in 1992
• No level of exposure considered “safe”
  – Damages DNA
• Inhalation causes cancer in the region of the throat behind the nose
• Non-cancer effects
Composite Wood Products Covered Under ATCM

• Hardwood Plywood (HWPW)
• Particleboard (PB)
• Medium Density Fiberboard (MDF)
Formaldehyde Emissions from Composite Wood Products

- Hardwood plywood
  - 240 tons per year
- Particleboard
  - 450 tons per year
- Medium density fiberboard
  - 190 tons per year
- Total of about 900 tons per year
Typical Formaldehyde Levels

- Acute REL (94 µg/m³)
- Chronic REL (3 µg/m³)

70 years at 1 µg/m³ = 6 lifetime cancers per million
Hardwood Plywood

Uses
- Non-structural paneling
- Cabinets
- Furniture
- Engineered floors
Particleboard

Uses:
• Cabinets
• Countertop core
• Floor underlayment
• Store fixtures
• Shelving
• Stair treads
MDF

Uses:

- Cabinets
- Furniture
- Moldings & trim
- Door skins
- Window components
- Shelving
- Engineered floors
- Speaker components
United States Emission Standards

- Set in 1985 by U.S. Dept. of Housing and Urban Development (HUD)
- Applies only to PB and HWPW in manufactured homes
- Limits surface emissions
- High emission rate compared to Europe, Australia, and Japan
International Emission Standards

• Lower than current U.S. standard
• Programs are fundamentally different; not directly comparable
• Generally not emission caps
Need for Control

- U.S. HUD standard not protective
- Childhood risk (9 years)*
  - 23-63 cancer cases per million
- Lifetime risk (70 years)*
  - 86-231 cancer cases per million

* Based on total daily average formaldehyde exposure
Available Technologies
Resin Options

• Common Resins
  – Urea-formaldehyde (UF)
  – Phenol-formaldehyde (PF)
  – Methylene Diisocyanate (MDI)
  – Polyvinyl Acetate (PVA)
  – Soy

• Emerging Resins
  – MDI Hybrids, Tannin-based, other soy blends
  – Modified UF resins – scavengers and blends
Best Available Control Technology Considerations

- Lowest level achievable
- In use and lab-tested alternative resins
- International standards
- Resin technology cost
Airborne Toxic Control Measure

Approved by the ARB on April 26, 2007
ATCM Applicability

- Panel manufacturers
- Distributors
- Importers
- Fabricators
- Retailers
- Finished goods
ATCM Provisions

- Applies to products sold, supplied, used, or manufactured for sale in California
- Emission standards in two phases
- Sell-through
- Exemptions
- Enforcement
Rationale for Phase 1 Standard

• Set an industry cap; over 50% of CWP mfrs. need to lower emissions

• Curtail low-cost, high-emitting imported products
**Approved Phase 1 Standards**

<table>
<thead>
<tr>
<th>Product</th>
<th>Jan 1, 2009</th>
<th>Jul 1, 2009</th>
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</thead>
<tbody>
<tr>
<td>HWPW-VC</td>
<td>0.08 ppm</td>
<td>-----</td>
</tr>
<tr>
<td>HWPW-CC</td>
<td>-----</td>
<td>0.08 ppm</td>
</tr>
<tr>
<td>PB</td>
<td>0.18 ppm</td>
<td>-----</td>
</tr>
<tr>
<td>MDF</td>
<td>0.21 ppm</td>
<td>-----</td>
</tr>
<tr>
<td>Thin MDF</td>
<td>0.21 ppm</td>
<td>-----</td>
</tr>
</tbody>
</table>
Resin Technologies for Phase 1 in 2009

HWPW, PB and MDF:

– UF + 4% Melamine
– Low mole ratio UF co-blend
Rationale for Phase 2 Standards

- Technology forcing
- Defines BACT
## Approved Phase 2 Standards

<table>
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<tbody>
<tr>
<td>HWPW-VC</td>
<td>0.05 ppm</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>HWPW-CC</td>
<td>-----</td>
<td>-----</td>
<td>0.05 ppm</td>
<td>-----</td>
</tr>
<tr>
<td>PB</td>
<td>0.09 ppm</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>MDF</td>
<td>0.11 ppm</td>
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<td>-----</td>
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</tr>
<tr>
<td>Thin MDF</td>
<td>-----</td>
<td>0.13 ppm</td>
<td>-----</td>
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</tbody>
</table>
BACT for Phase 2 in 2010-12

• HWPW
  – UF + 15% Melamine
  – PVA
  – PVA-Soy Blend
• PB
  – Low mole ratio UF + 8% Melamine
  – Low mole ratio UF + Scavengers
  – PF
• MDF
  – Low mole ratio UF + 12% Melamine
  – Low mole ratio UF + Scavengers
  – Polymeric MDI
Sell-through

• Allows sale of non-compliant products manufactured before standard effective
• Time period limited
• Differing sell-through periods
Exemptions

• Products not for sale in California
• Products subject to HUD standards
• Windows with <5 vol% composite wood
• Exterior doors; doors with <3 vol% composite wood
• Military specification plywood
• Vehicles
Enforcement Provisions

- Third Party Certification
- Statements of Compliance
- Recordkeeping
- Product Labeling
- Facility Inspections
- Compliance Testing
Importance of Enforcement

• Necessary to achieve ATCM benefits
• Fair competition between imports and domestic products
• Essential to viability of industry
KCMA Members

• Fabricators
  – Must use compliant wood products, label products and keep records

• Panel manufacturer/fabricator
  – Must also TPC panel products

• Importers
  – Must use “reasonable prudent precautions”
  – Maintain “statement of compliance” documentation
Fabricator Responsibilities

- Buy compliant wood products from TPC certified manufacturers
- Maintain records documenting compliant purchases and product sales
- Apply labels denoting compliance with CARB standards
- Adhere to product sell-through provisions
- Report unscrupulous practices
Benefits and Impacts
Emissions, Exposure, and Risk Reductions

• **Emission reductions**
  – 180 tons per year - Phase 1
  – 500 tons per year - Phase 2

• **Exposure reductions***
  – 15% - Phase 1
  – 40% - Phase 2

• **Lifetime cancer risk reductions***
  – Baseline 86-231 cases
  – 12-35 cases reduced – Phase 1
  – 35-97 cases reduced – Phase 2

* Based on total daily average formaldehyde exposure
## Increase in Panel Production Costs

<table>
<thead>
<tr>
<th>Product</th>
<th>Phase 1</th>
<th>Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWPW</td>
<td>&lt; $0.20</td>
<td>$4 to 6</td>
</tr>
<tr>
<td>PB</td>
<td>&lt; $1</td>
<td>$3 to $4</td>
</tr>
<tr>
<td>MDF</td>
<td>&lt; $1</td>
<td>$4 to $6</td>
</tr>
</tbody>
</table>
## Annual Industry-wide Costs

<table>
<thead>
<tr>
<th>Product</th>
<th>Phase 1</th>
<th>Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWPW</td>
<td>$6 million</td>
<td>$17 million</td>
</tr>
<tr>
<td>PB</td>
<td>$5 million</td>
<td>$61 million</td>
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<tr>
<td>MDF</td>
<td>$9 million</td>
<td>$49 million</td>
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<tr>
<td>Total -- All</td>
<td>~$19 million</td>
<td>$127 million</td>
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Air Resources Board Action at April 27th Hearing

• Adopted staff’s proposed modified regulation (7-0 vote)

• Directed staff to provide enforcement program update for Board in 2008

• Delegated authority to Executive Officer to reopen the public record for subsequent 15-Day public comment period
Approved Modifications to the Original Proposal

• Move HWPW-VC implementation up one year to Jan. 2010

• Exemption for garage and exterior doors

• Performance-based compliance option for low-emitting formaldehyde based resins
Approved Modifications to the Original Proposal (cont’d)

• Sell-through provision dates
• Definition of “architectural plywood”
• Other clarifications
Other ATCM Related Issues

- Dual inventories for CA and 49-state
- Direct sales to builders
- Internet sales
- Finished product testing
- Enforcement liability
2007 Schedule

June- Industry consultation

July- Release modified regulation for public comment

Summer- Lab development; DHS chamber study

Fall- Large chamber correlation; round robin testing

Winter- Complete ATCM OAL process
Thank you for your Interest!

For more information, visit our website:
http://www.arb.ca.gov/toxics/compwood/compwood.htm

Or, contact-
Jim Aguila, Manager
Substance Evaluation Section
(916) 322-8283; jaguila@arb.ca.gov