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

Composite Panel Association- Spring Meeting

Rancho Mirage, California

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California Air Resources Board

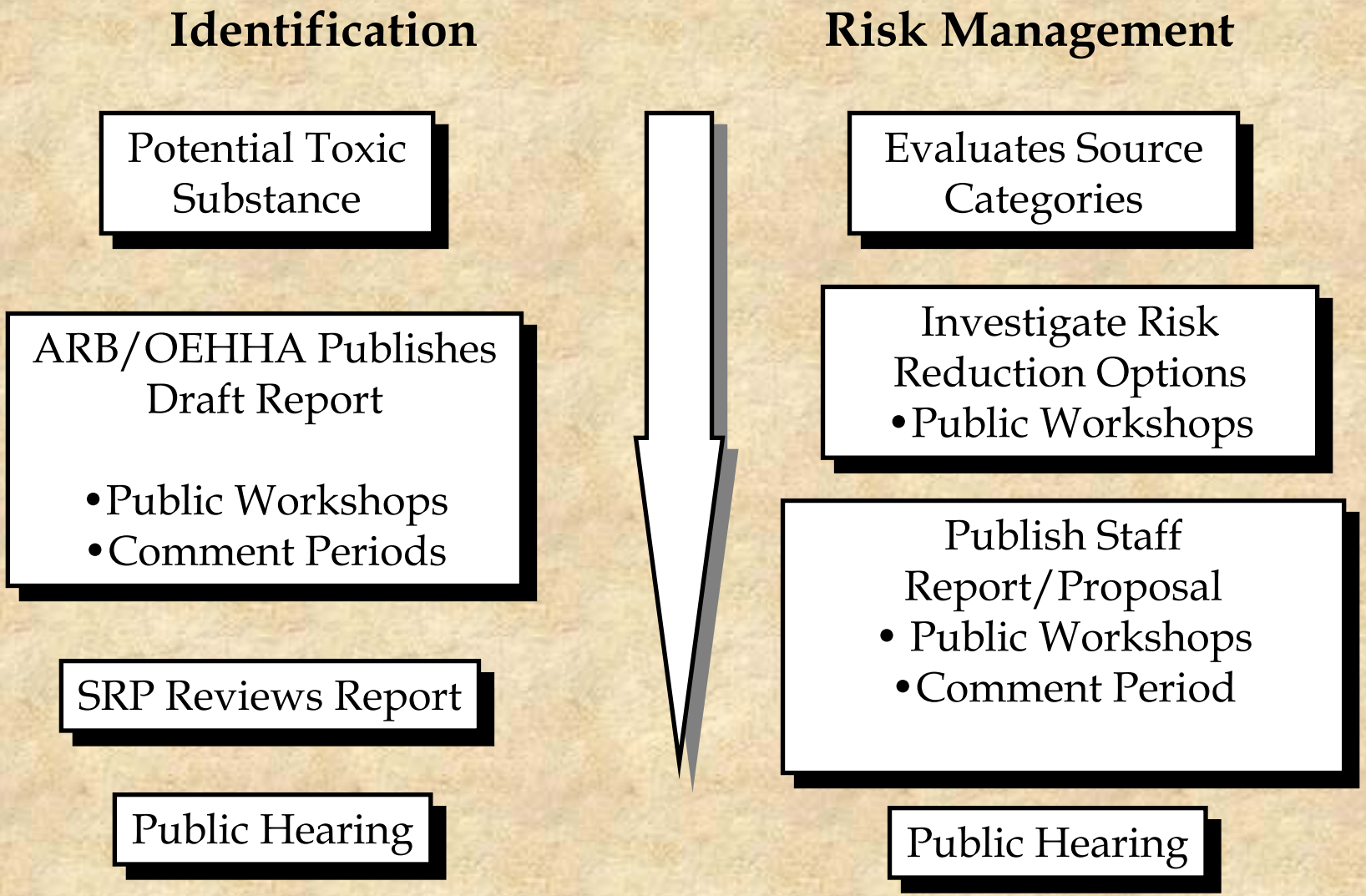
May 7, 2007

Outline

- Background
- Available Technologies
- Approved Airborne Toxic Control Measure
- Benefits and Impacts
- April ARB Hearing Summary
- 2007 Schedule

Background

California's Air Toxics Program



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)

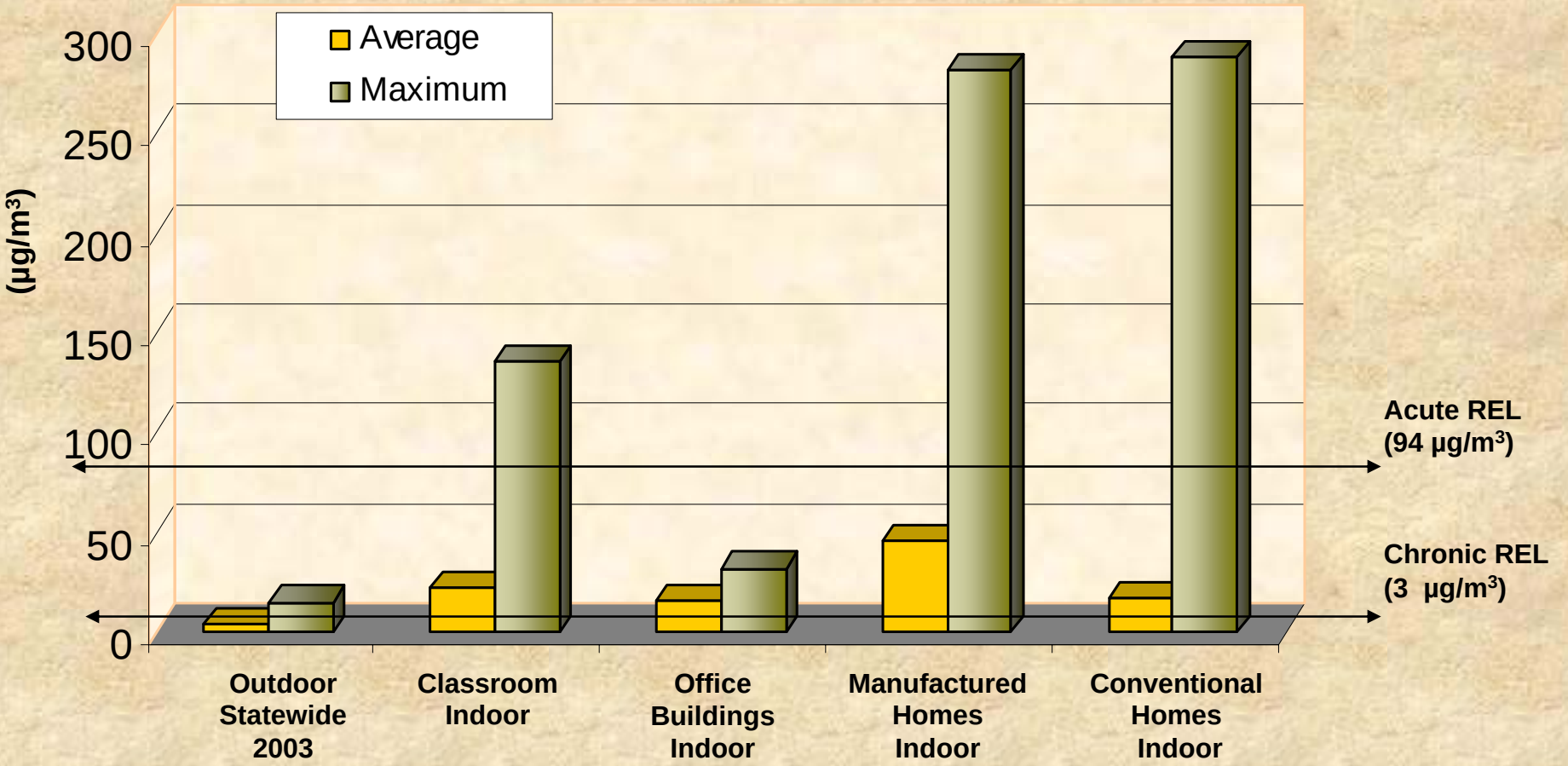
Formaldehyde Emissions from Composite Wood Products

- 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

Emission Sources

- Manufacturing plants
- Fabrication facilities
- Home construction
- Transport
- Indoor air moving outside

Typical Formaldehyde Levels

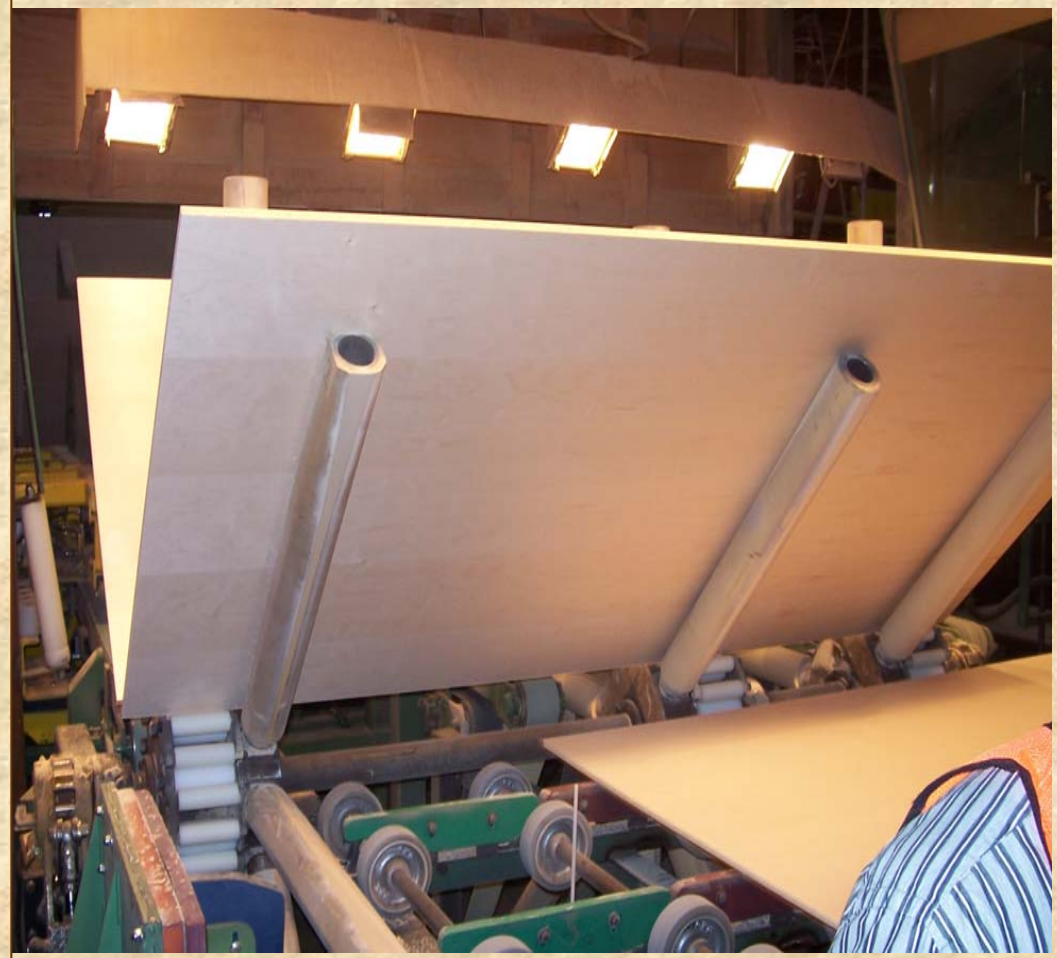


70 years at 1 µg/m^3 = 6 lifetime cancers per million

North American Composite Wood Industry

- HWPW
  - 2002 U.S. production: ~2.5 billion sq. feet
  - No. of North American mills: 51
- PB
  - 2002 U.S. production: ~5.4 billion sq. feet
  - No. of North American mills: 40
- MDF
  - 2002 U.S. production: ~2.4 billion sq. feet
  - No. of North American mills: 26

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

U.S. Emission Standards

- United States
  - 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

Product	Jan 1, 2009	Jul 1, 2009
HWPW-VC	0.08 ppm	-----
HWPW-CC	-----	0.08 ppm
PB	0.18 ppm	-----
MDF	0.21 ppm	-----
Thin MDF	0.21 ppm	-----

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

Product	Jan 1, 2010	Jan 1, 2011	Jan 1, 2012	Jul 1, 2012
HWPW-VC	0.05 ppm		-----	-----
HWPW-CC		-----	-----	0.05 ppm
PB		0.09 ppm	-----	-----
MDF		0.11 ppm	-----	-----
Thin MDF		-----	0.13 ppm	-----

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 <5vol% composite wood
- Exterior doors; doors with <3vol% 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

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

Product	Phase 1	Phase 2
HWPW	< $0.20	$4 to 6
PB	< $1	$3 to $4
MDF	< $1	$4 to $6

Annual Industry-wide Costs

Product	Phase 1	Phase 2
HWPW	$6 million	$17 million
PB	$5 million	$61 million
MDF	$9 million	$49 million
Total -- All	~$19 million	$127 million

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
- 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

2007 Schedule

May- 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-

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Substance Evaluation Section

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