ARB Evaluation of Composite Wood Products

Stakeholder Meeting
August 4, 2004

Air Quality Measures Branch
Stationary Source Division

California Environmental Protection Agency

Air Resources Board

Outline

- Background
  - legal framework
  - health information
- Technology Evaluation
  - Survey Review
    - emissions performance
    - resin technology
    - manufacturing process
  - Product Emissions Assessment
- Potential Regulatory Concepts
- Schedule

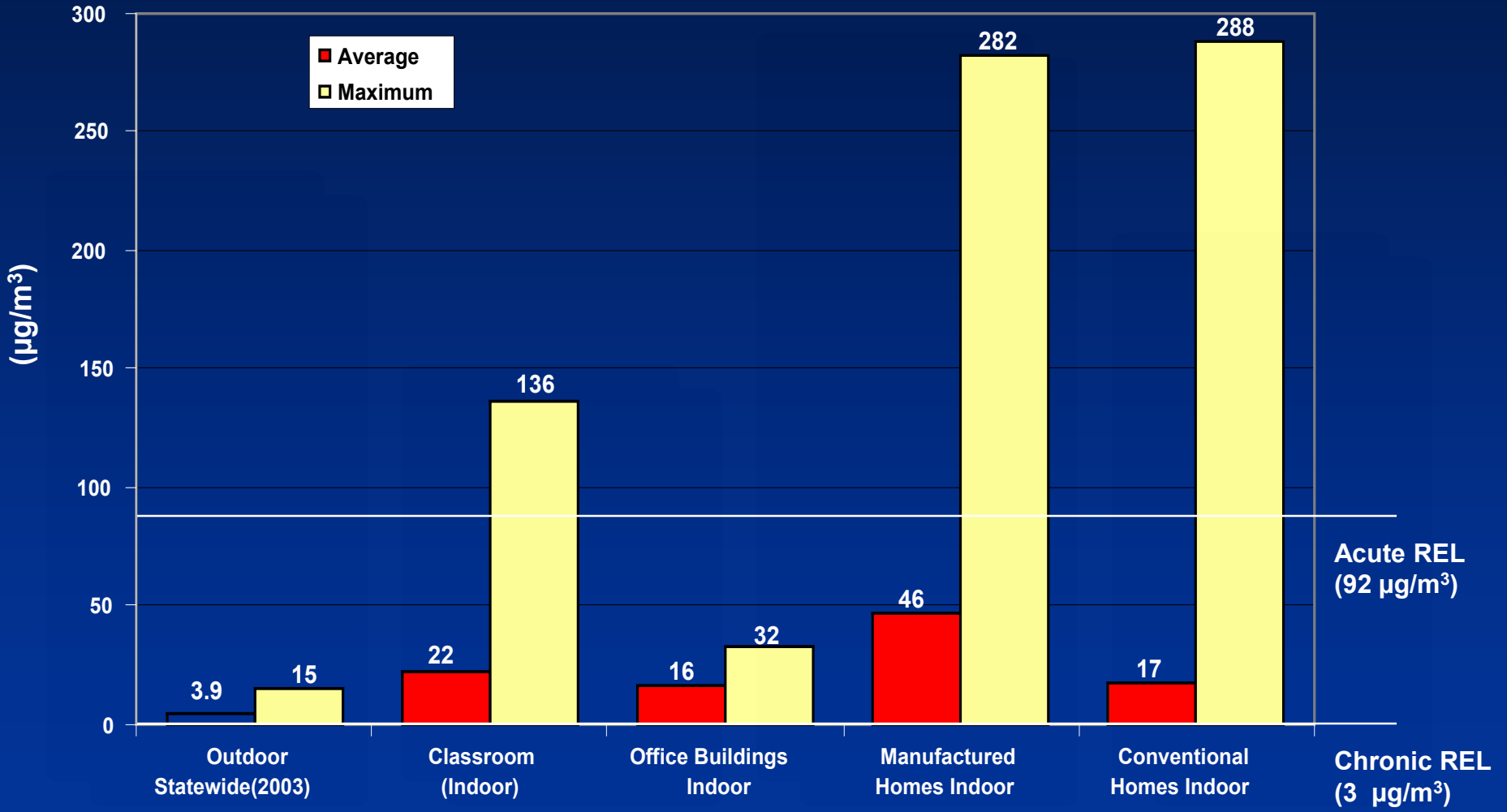
California Health & Safety Code Requirements

- **§ 39657 - Requires ARB to identify toxic air contaminants; identify minimum threshold level**
- **§ 39658 - Requires ARB to develop Air Toxic Control Measures (ATCMs)**
- **§ 39660.5 -Requires ARB to assess California's indoor exposure to toxic air contaminants (TACs) and the relative contribution to total exposure**
- **§ 39665 - Requires ARB to prepare a report on the need and appropriate degree of regulation**
- **§ 39666 - For compounds with no threshold level, the HSC requires the development of control measures based on best available control technology, or more effective controls in consideration of costs and risk**

Why is Formaldehyde a Concern in California?

- Identified as a TAC by the ARB in 1992
  - Nasopharyngeal cancer: URF = 6 cases/million people (1 µg/m^3 , 70 years exposure)
- Formaldehyde identified as a HAP by the U.S. EPA
  - B1 cancer classification - probable human carcinogen
  - Nasopharyngeal cancer: URF = 13/million (1 µg/m^3 per 70 year exposure)
  - Ranked #1 indoor pollutant for non-cancer effects
- Classified by IARC as a known human nasopharyngeal carcinogen
- Acute eye irritation over 94 µg/m^3 (1 hr. avg. aREL)
- Chronic respiratory health problems over 3 µg/m^3 (annual avg. cREL)

What are Typical Formaldehyde Levels?



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

Emissions and Exposure

- Statewide formaldehyde emissions

	TPY	
– Mobile sources -	16,185	(77%)
– Stationary Sources -	2,871	(14%)
– Area sources -	1,976	(9%)

- Exposure levels
  - Statewide average ambient - 4.3 $\mu g/m^3$
  - Indoor air range - 16 to 290 $\mu g/m^3$

Why Composite Wood Products?

- Risk levels due to formaldehyde are elevated
  - SB 25 (Tier II)
- Major source of personal exposure to formaldehyde
  - Formaldehyde levels indoors are typically 2 to 10 times those outdoors
  - Over 85% of time indoors for most Californians
  - More than 90% of exposure to formaldehyde occurs indoors
- Opportunity to reduce personal formaldehyde exposures in California
- CWPs contribute to outdoor concentrations (shipping, inventories, potential near source)

Chronology

2001: Began work on Composite Wood Product Measure; public meeting; (2) Composite Wood Product Stakeholders meetings; initiate survey

2002: (2) Industry meetings; plant tours; (2) conference calls regarding survey; FETEG Formaldehyde Petition

2003: OEHHA evaluation of FETEG Petition; product survey conducted; initiate technology assessment and staff industry evaluation; second industry petition submittal

2004: Survey result evaluation; continued technology assessment; regulatory options development; SRP meeting on FETEG Petition

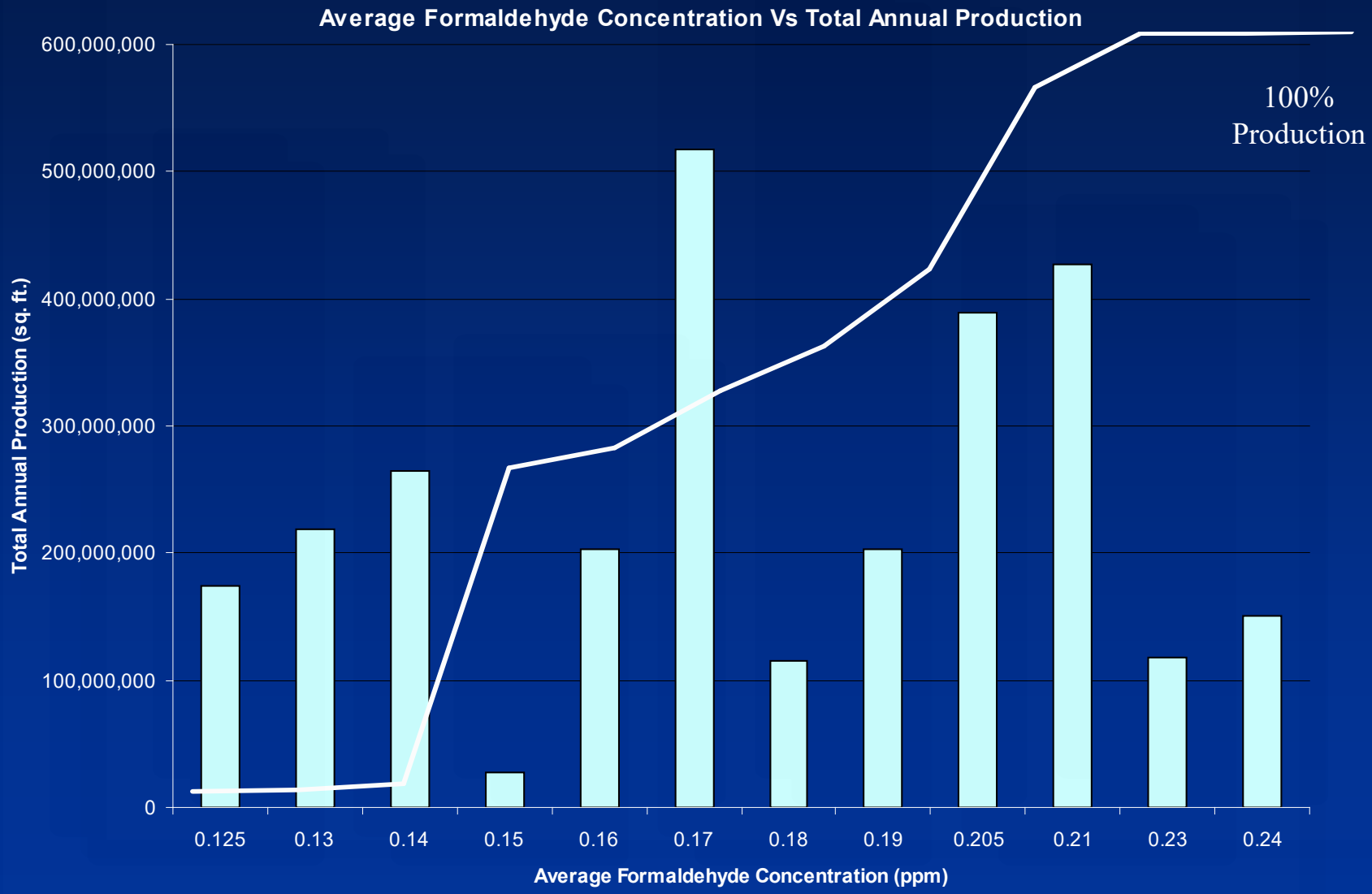
2002 Composite Wood Product Survey

- Nationwide Distribution (37 Major Producers)
- 7 products surveyed
  - 4 main products use non UF-based resins (OSB, SWPW, HB, LVL)
  - 3 main products use UF-based resins (PB, MDF, HWPW)

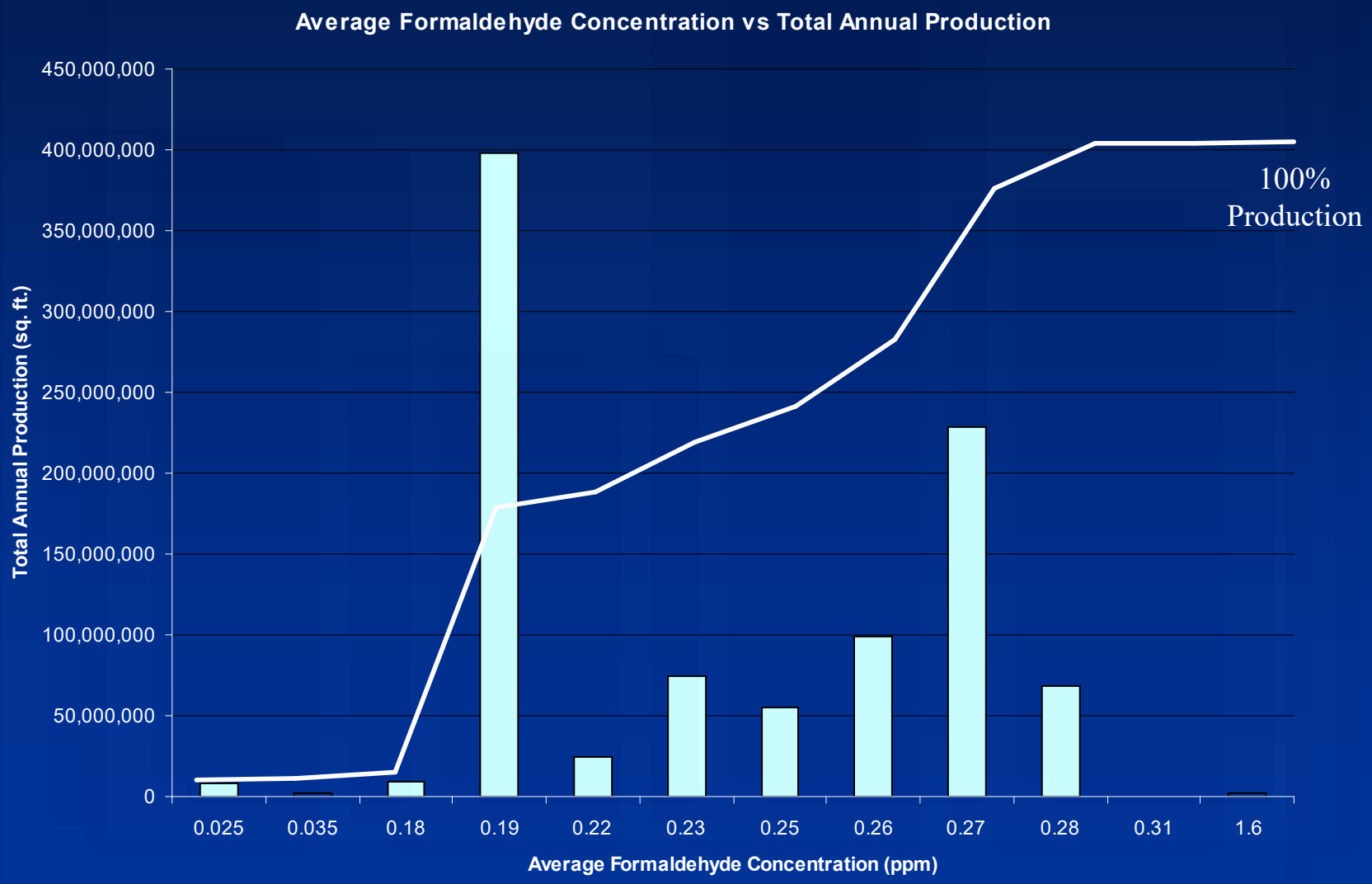
	Annual Production (x 10^6 M^3)		
	ARB Survey	**Industry reference**	**% Response**
Particleboard	5.1	9.6	53
MDF	2.9	3.5	83
HWPW	1.3	1.8	73

Staff Evaluation

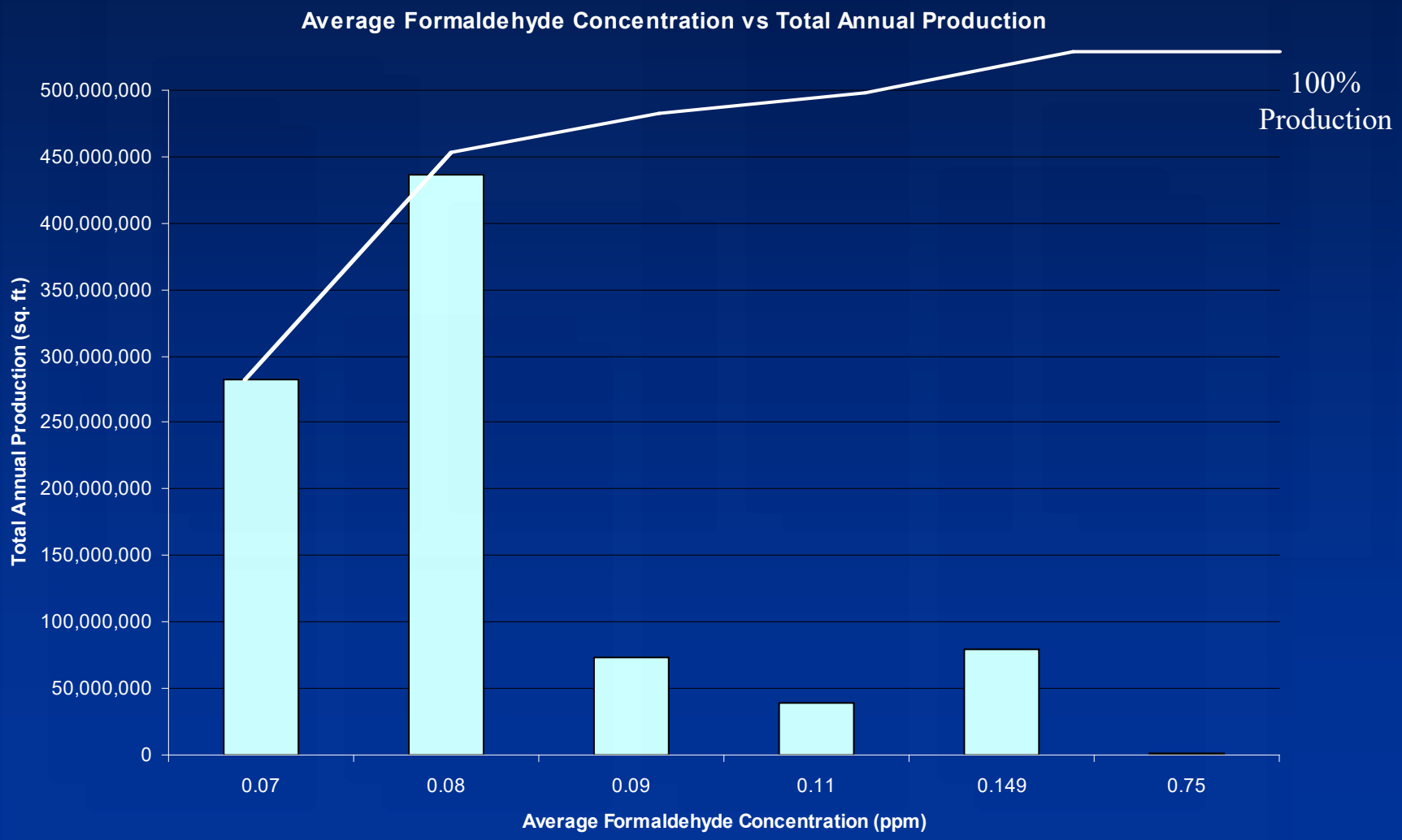
Particleboard



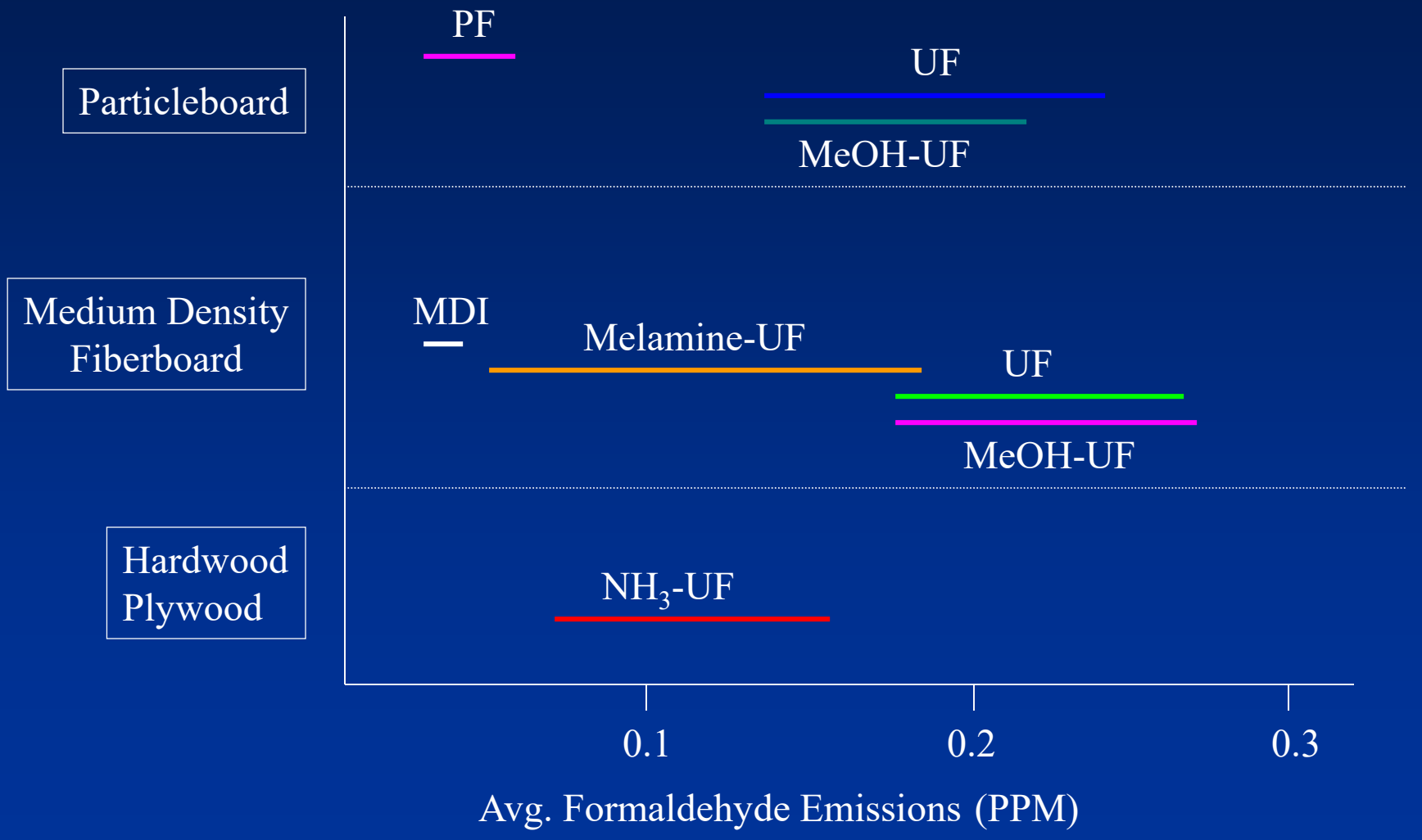
Medium Density Fiberboard



Hardwood Plywood



2002 CWP Survey- *Resin Use*



Emission Performance of Today's Resins

Product	Resins Used	% Survey Production	Emission Average Range (ppm)
Particleboard	UF Methanol-UF Phenol-F	51 48 1	0.13 – 0.24 0.13 – 0.21 NA
Medium Density Fiberboard	UF Melamine-UF Methanol-UF MDI	40 39 20 1	0.18 – 0.27 0.04 – 0.19 0.18 – 0.28 0.02 – 0.03
Hardwood Plywood	Ammonia-UF	100	0.07 – 0.15

2002 CWP Survey - *Manufacturing Process*

- Manufacturing flowcharts very similar
  - wood preparation, dryers, blenders, presses
- Variation in process equipment mfrs. & vintage
  - Plant closures have led to reuse of old equipment
- Presses
  - Different types in use today (continuous, steam heated, conventional)
  - Newer models have process flexibility; increase production
- Blenders
  - Older equipment have basic designs
  - Newer models have lower maintenance; resin use savings

What are the Sources of Formaldehyde Emissions in California?

Emission Inventory	Tons/Year
Stationary Sources	2900
Area-wide Sources	2000
On-Road Mobile	6000
Gasoline Vehicles	*4100*
Diesel Vehicles	*1900*
Other Mobile	10000
Total Statewide	***20900***
Est. Composite Wood Products	*90*

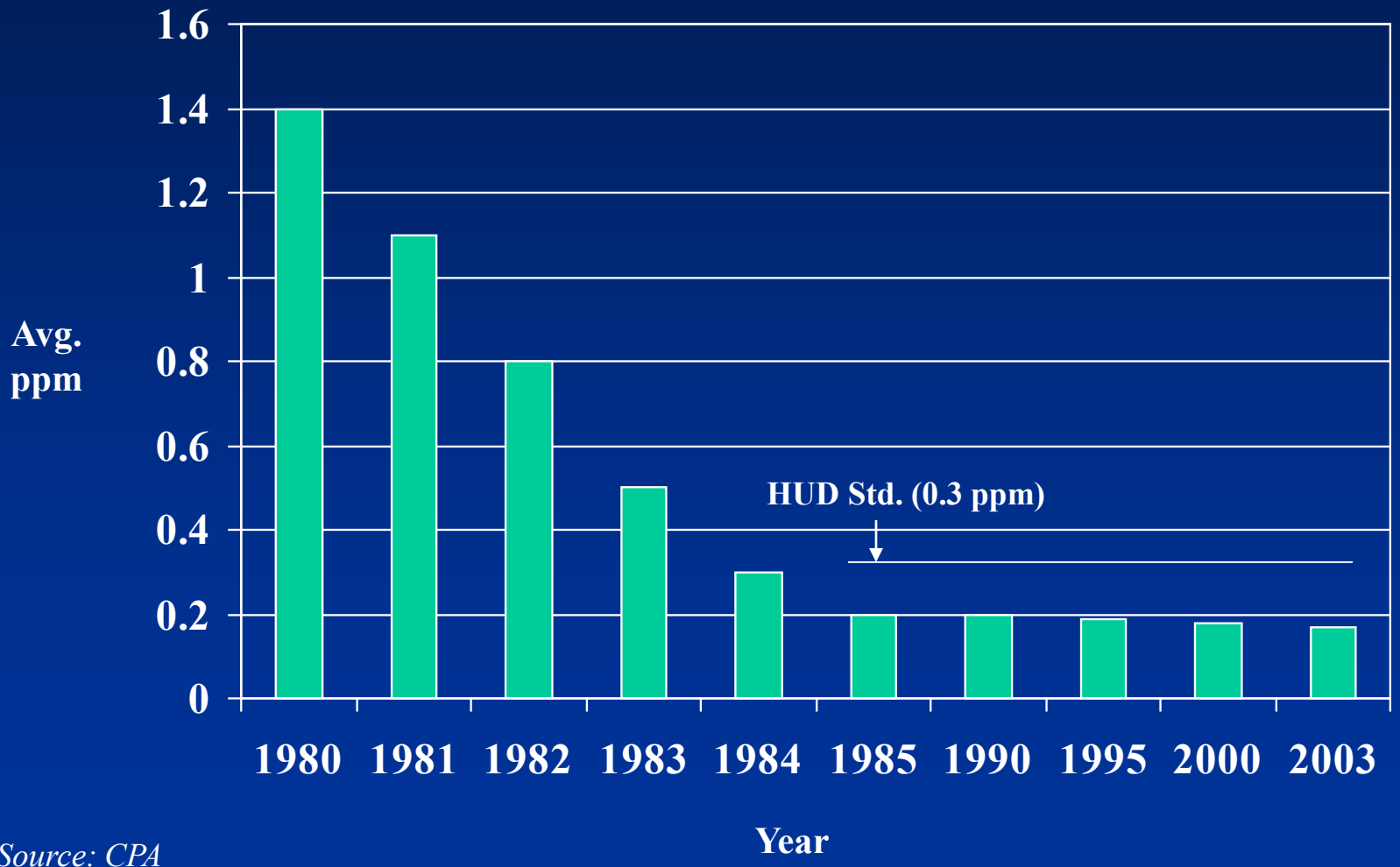
Best Available Control Technology Evaluation

- ARB is required by law to reduce emissions through application of BACT or a more effective control method considering what is technologically feasible and cost effective
- ATCM specific - technology based
- Survey to evaluate lowest emitting product and facility technologies
- Personal contacts
- Research on new low-emitting products and other alternative methods of reducing exposures to formaldehyde
  - patent searches
  - technical literature
- Evaluation of manufacturing processes
  - site visits
  - technical literature
  - ARB and USEPA Surveys

Options for Reducing Emissions

- Present Day Technology
  - Copolymer blends
  - Melamine additive
  - Post production treatment
  - Other scavengers
  - Alternative resins (PF, MDI)
  - Lamination (?)
- Promising Technologies
  - Organic based resins (lignin, tannin, soybean)
  - PF/UF copolymers
  - PF hybrid

Historical Formaldehyde Emissions from Particleboard



Source: CPA

What is the Potential Regulatory Concept Under Consideration?

Focus on Current Technology (2004-2005)

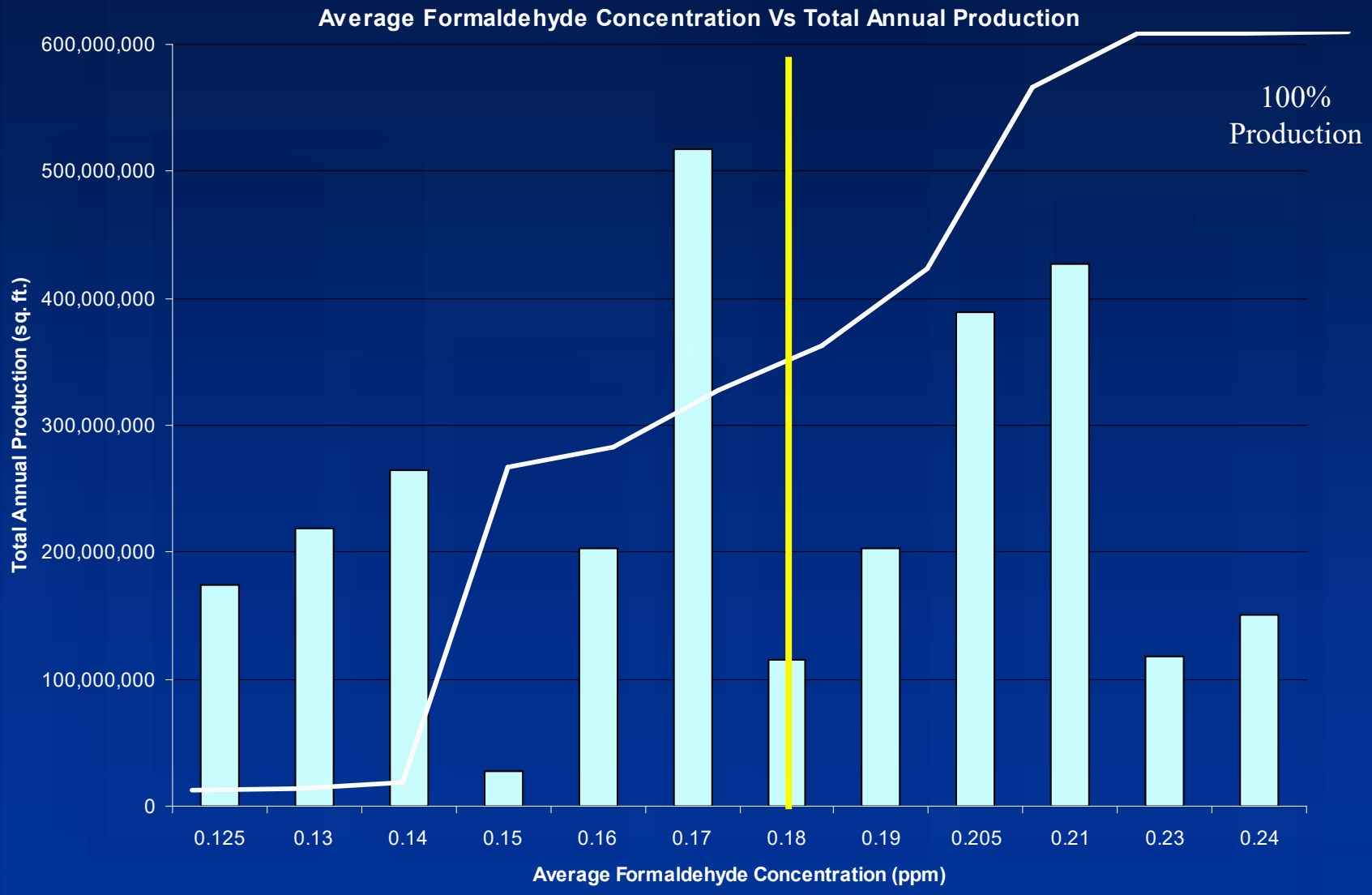
- Would not require shift away from Urea-Formaldehyde resins
- Would apply to sales and use of products in California including furniture, cabinet making, and case goods

ATCM
Potential Regulatory Approach

- Product Performance Emissions Standards
  - MDF, PB, HWPW
  - Technology based
- Application
  - Production & Use
  - Includes imports
  - HUD exemption
- Enforcement Program
  - Test method
  - Documentation

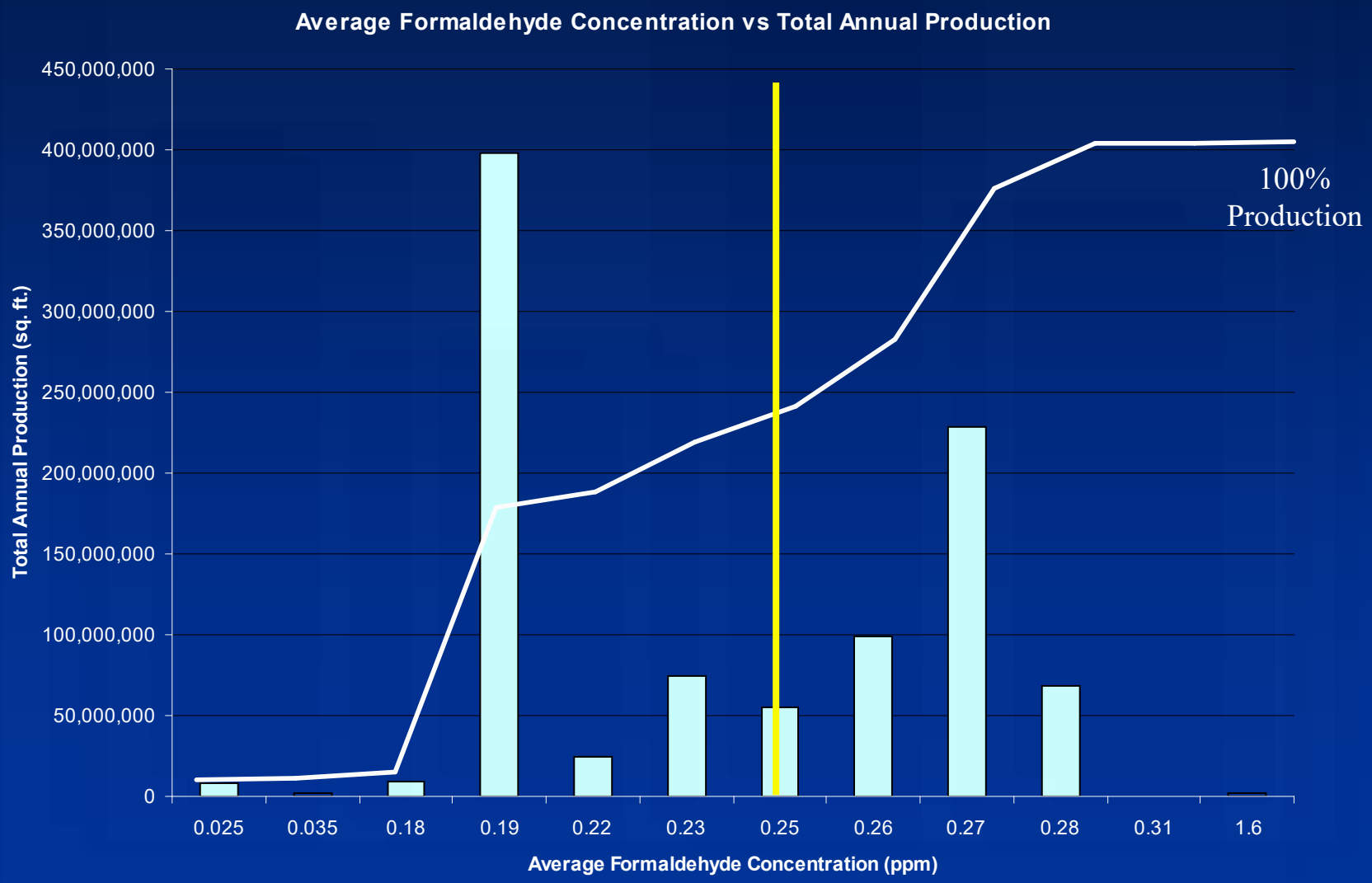
Conceptual Std.

Particleboard



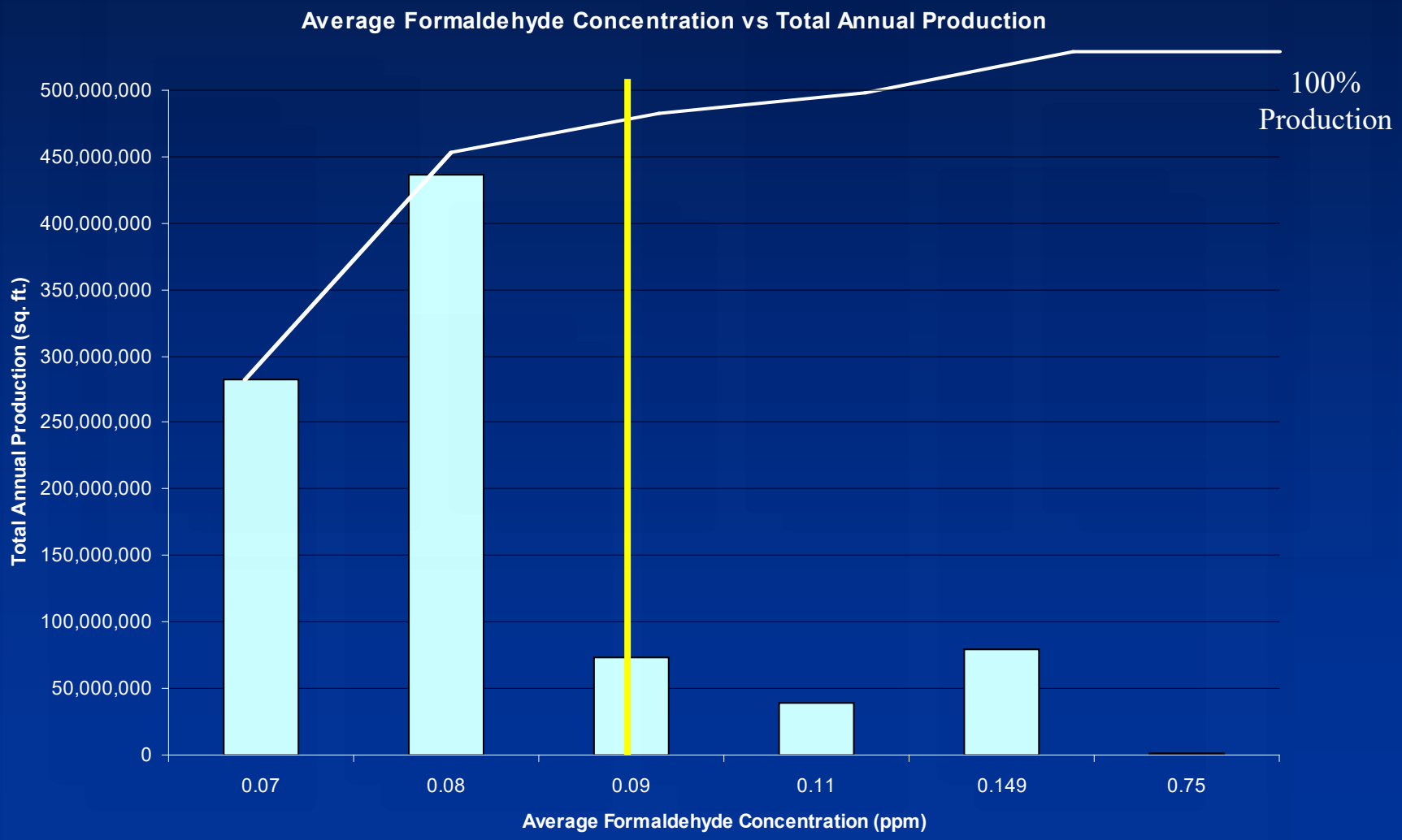
Conceptual Std.

Medium Density Fiberboard



Conceptual Std.

Hardwood Plywood



Data Needs

- Particleboard responses -to better represent the state of the industry
- Range of emissions data including test variability
  - Maximum and minimum values
- Costs of achieving a lower emission standard

Schedule

Summer

- Discuss potential regulatory concepts

Fall

- Stakeholders meeting to discuss initial regulatory proposal
- Develop enforcement program
- Proposal cost analyses
- Develop regulatory language

Winter/Spring

- Develop needs assessment/staff report
- Air Resources Board public Hearing