

Columbia Forest Products Composite Wood ATCM Recommendations

March 2007



Columbia Executives

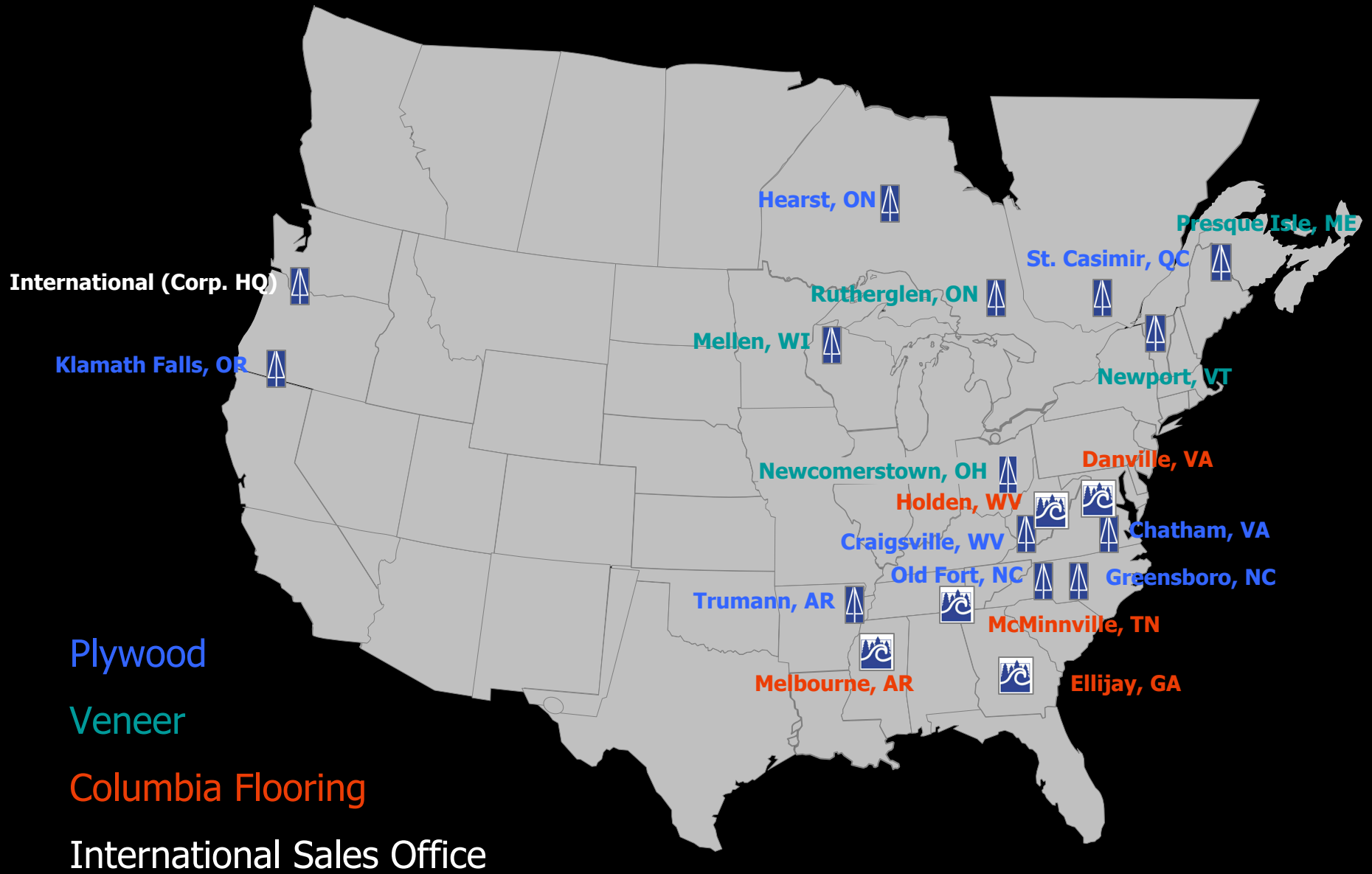
- Harry Demorest, CEO
- Elizabeth Whalen, Director of Corporate Sustainability
- Phill Guay, VP of Marketing & Corporate Strategy
- Ed Woods, Executive VP
- Len Bergstein, Public Affairs Consultant

Columbia Forest Products

- North America's largest manufacturer of hardwood plywood, veneer and flooring
- 20 manufacturing plants in North America
- 100% ESOP company with over 4,000 employee-owners
- Celebrating 50 years in business
- Manufactures 60,000 panels/day = 40% domestic share
- Annual revenues in excess of \$1B US



Columbia North American Operations



Hardwood Plywood Overview

Columbia's products are used for making kitchen cabinets, furniture, retail store fixtures, architectural millwork – all interior applications



 PureBond™
A breath of
fresh thinking.

 **columbia**
FOREST PRODUCTS

Phase I and II Emission Standards for Hardwood Plywood (HWPW), Particleboard (PB), and Medium Density Fiberboard (MDF)¹

Effective Date	Phase 1 (P1) and 2 (P2) Emission Standards (ppm)				
	HWPW-VC	HWPW-CC	PB	MDF	Thin MDF
1-1-2009	P1: 0.08	-----	P1: 0.18	P1: 0.21	P1: 0.21
7-1-2009	-----	P1: 0.08	-----	-----	-----
1-1-2011	P2: 0.05	-----	P2: 0.09	P2: 0.11	-----
1-1-2012	-----	-----	-----	-----	P2: 0.13
7-1-2012	-----	P2: 0.05	-----	-----	-----

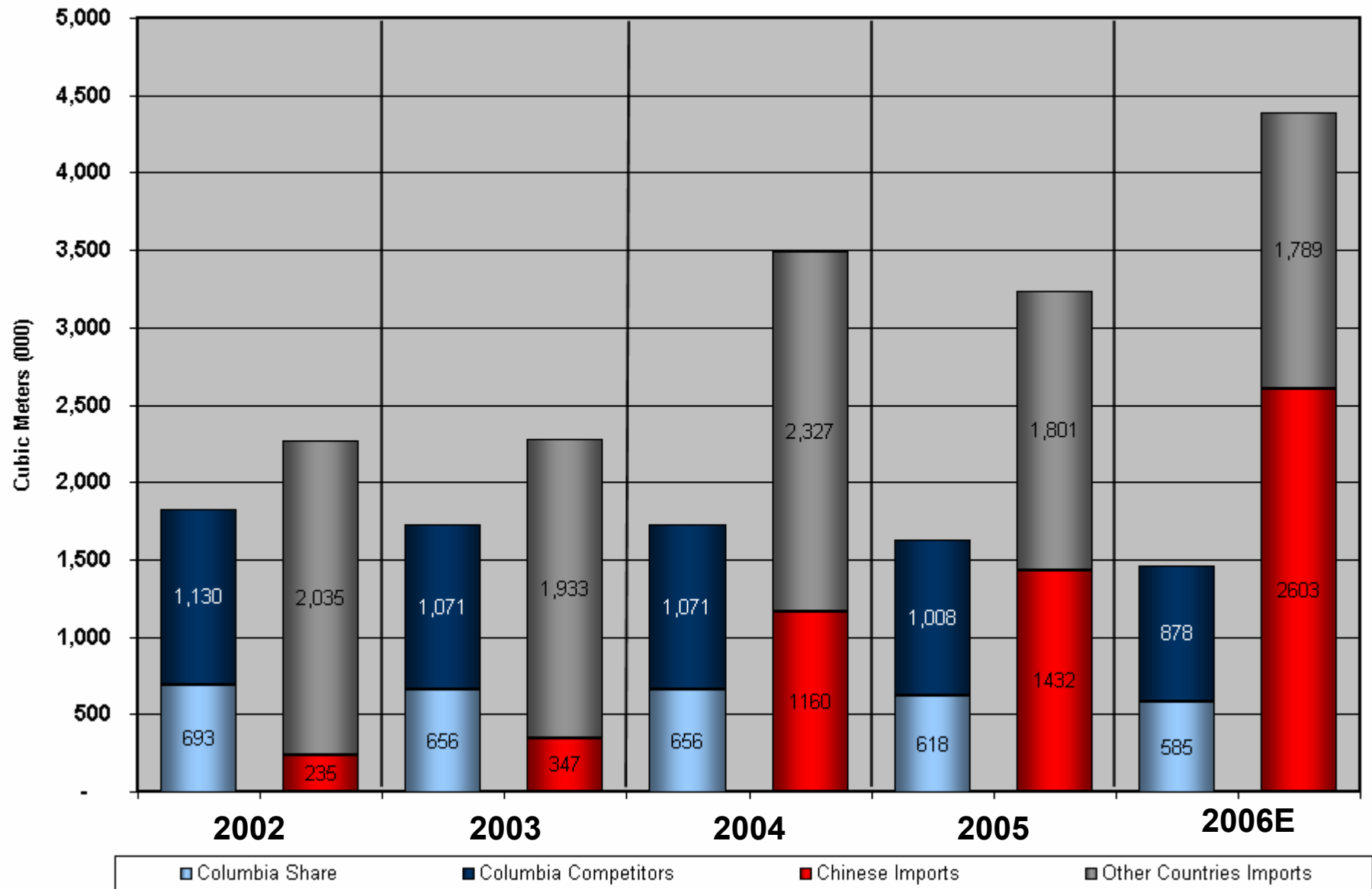
Footnote 1: Based on the large chamber test method (ASTM E-1333) in parts per million (ppm).
HWPW-VC=VC; HWPW-CC=composite core where the core material is PB or MDF.

Achievable Hardwood Plywood Emission Standard¹

Effective Date	Recommended Phase 1 (P1) and 2 (P2) Emission Standards (ppm)			
	HWPW - VC / CC	PB	MDF	Thin MDF
1-1-2008	Voluntary P1: 0.07	P1: 0.18	P1: 0.21	P1: 0.21
1-1-2009	Mandatory P1: 0.07			
1-1-2010	Mandatory P2: 0.05			
1-1-2011	-----	P2: 0.09	P2: 0.11	
1-1-2012	----- -----			P2: 0.13

Footnote 1: Based on the large chamber test method (ASTM E-1333) in parts per million (ppm).
HWPW-VC=VC; HWPW-CC=composite core where the core material is PB or MDF.

North American Hardwood Plywood Supply '02 – '06





**NATURE-INSPIRED DESIGN
ROOTED IN BIOMIMICRY.**

How PureBond works.

→ **Dr. Kaichang Li, Ph.D.**
Associate Professor,
Oregon State University

Columbia Forest Products
P.O. Box 1780
Klamath Falls, OR 97601
Attn: Jerry Peyton

Non-Quarterly Chamber

Report Of: Large Chamber Test for
Formaldehyde Emissions
Location: Pittsburgh Testing
Laboratory, Eugene, OR
Report #: 721-46139
Sample #: 5418

This test was run in accordance with ASTM E1333
(Determining Formaldehyde Levels using a Large Chamber Test Method.)

Chamber Results

Production Data

	Impinger #1	#2
Observed Flow Rate (l/m)	0.97	1.03
Corr. Vol. of Air Sample	58.57	62.19

Product:	3/4" Red Oak Plywood CFP special Glue test
Mill Code:	
Prod Group:	
Test Date:	02/22/05
Prod. Date:	02/02/05
Control Date:	02/02/05
Coll. Date:	02/11/05

Raw Absorbance Values	0.012	0.012
	0.014	0.011
	0.012	0.012
Average Absorbance	0.013	0.012

Unadjusted PPM	0.00	0.00
Standardized to 77°F	0.00	0.00
Standardized to 50% RH	0.00	0.00

Average PPM **0.00**

Maximum PPM:

Avg. **NA**

Comments: Below detectable limits.

**Matching
Desiccator**

Chamber Conditions

Barometric Pressure (in)	30.09
Dry Bulb Temp. (°F)	76.6
Relative Humidity (%)	47
Length of Test (minutes)	60

Parameters:

Sample Size: Three @ 48" x 67.25" or 49" x 66" equaling 134.5 sq. ft.
Chamber Dimensions: 149.5" x 124.5" x 96" Volume = 1034 cubic ft.
Air Exchange Rate: 0.5 +/-0.05 air changes per hour
The chamber is activated under positive pressure. The air sampling rate was 1.0 liters per minute at 60+/- 2 minutes.

The samples were conditioned for seven days prior to testing at 70° to 80° F and 45% to 55% relative humidity. During conditioning, the formaldehyde background level was 0.1 parts per million or less.
Services performed for this project have been conducted with a level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar conditions and restraints. No warranty, expressed or implied, is made.

Respectfully submitted,

Professional Service Industries, Inc.
Pittsburgh Testing Laboratory Division
Randy Webb
Engineered Wood Products

Superior bonding performance:



UF-bonded plywood

Two-cycle boil test: 100% failure

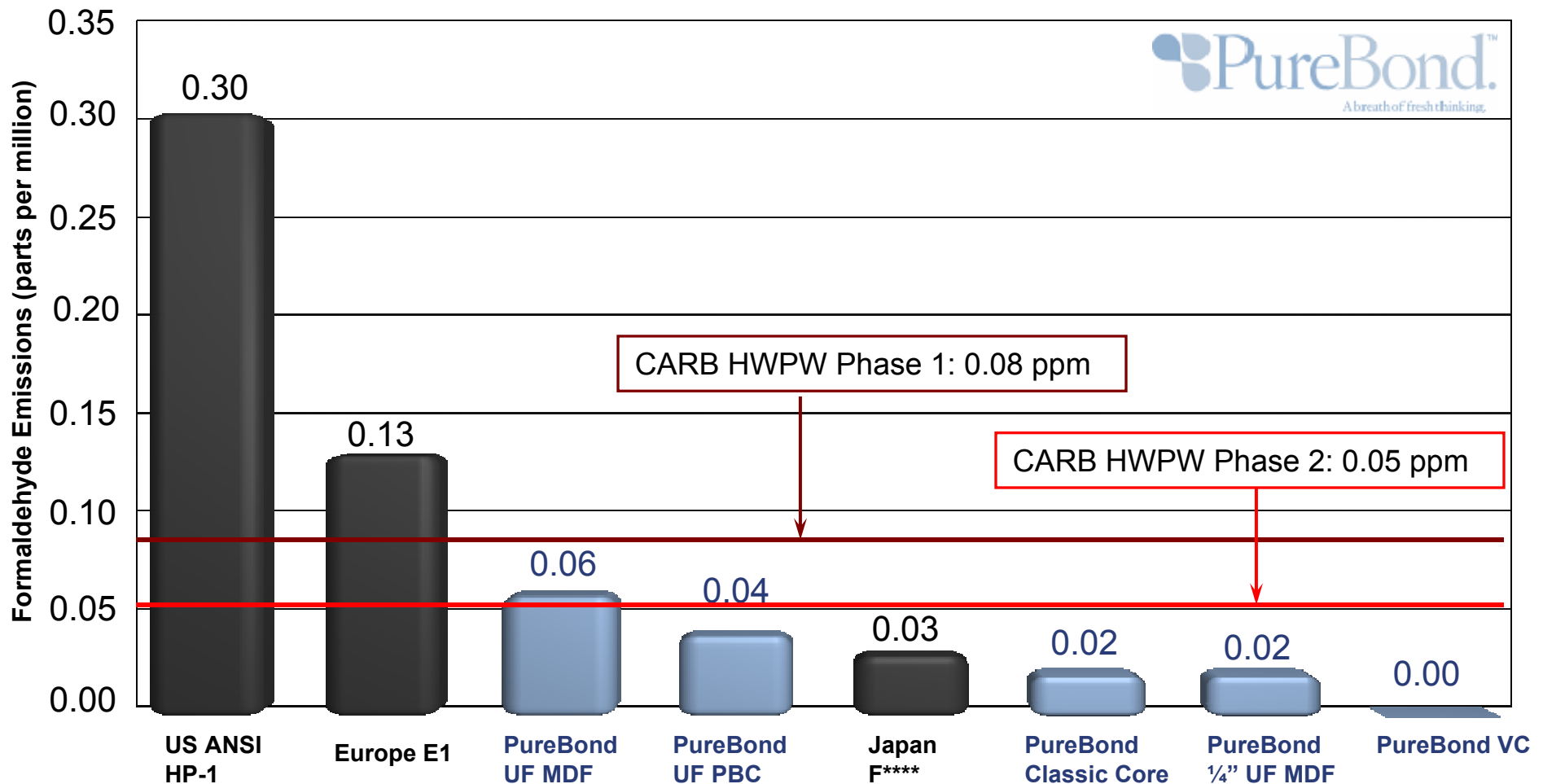


PureBond™ plywood

Two-cycle boil test: 90% pass

Because PureBond test samples do not pass the 2 cycle boil test 100% of the time, PureBond panels are not rated for exterior use; however, PureBond does offer a measurable improvement in moisture resistance over UF. (PureBond panels pass 3 cycle soak tests required by ANSI HP-1-2004 100% of the time.)

Columbia PureBond™ hardwood plywood emissions compared to US ANSI HP-1-2004 & foreign standard equivalents




- This slide compares relative formaldehyde emissions between PureBond & UF adhesive in hardwood plywood assemblies.
- Tests performed under controlled temperature, humidity and air exchange rates unique to ASTM E-1333 (large chamber) criteria.
- Composite cores tested contained urea formaldehyde resins but were laminated with Columbia's new formaldehyde-free adhesive system.
- Classic Core combines regular core veneers with thin layers of UF-bonded MDF for a smooth surface beneath decorative face and back veneers.

Review of materials available now for low-emitting hardwood plywood construction

Company	Product	Type	Emissions ¹
Columbia Forest Products	PureBond®	Hardwood Plywood Assembly	.00 - .02 ppm
Roseburg	SkyBlend™	Particleboard	< 0.04 ppm
	SkyPly™	Hardwood Plywood	< 0.09 ppm
Dongwa		Phenolic MDF	Not Avail.
Sierra Pine	Medite II®	MDF	< 0.05 ppm
	Arreis™	MDF	
Various	Poly Vinyl Acetate	Hardwood Plywood Assembly	.02 - .08 ppm

Footnote-1: Information source: Manufacturer's cut sheets, SCS certificates or third party testing arranged for by Columbia Forest Products

Low-emitting plywood adhesive systems - available now

Company	Products	Large Chamber ppm ¹
Hexion – EcoBind™	Ultra-low emitting urea formaldehyde resins	≤ 0.06 ppm
 <p>EcoBind™ is a family of resin technologies from Hexion, specifically developed to reduce formaldehyde emissions from wood products to the lowest possible levels.</p>	Co-reactants to standard UF resin systems	≤ 0.03 ppm
	PVA/Soy adhesive formulation	Not Avail.
Akzo Nobel	UMF Catcher™ Resin	0.02 – 0.05 ppm
Hercules/CFP Soy	PureBond®	≤ .02 ppm
An entire industry	Poly – Vinyl Acetate (PVA)	.02 - .08 ppm
Hexion, Dynea, GP	Phenol Formaldehyde (PF)	.02 - .06 ppm

Footnote-1: Information source: Manufacturer's cut sheets, CARB presentation

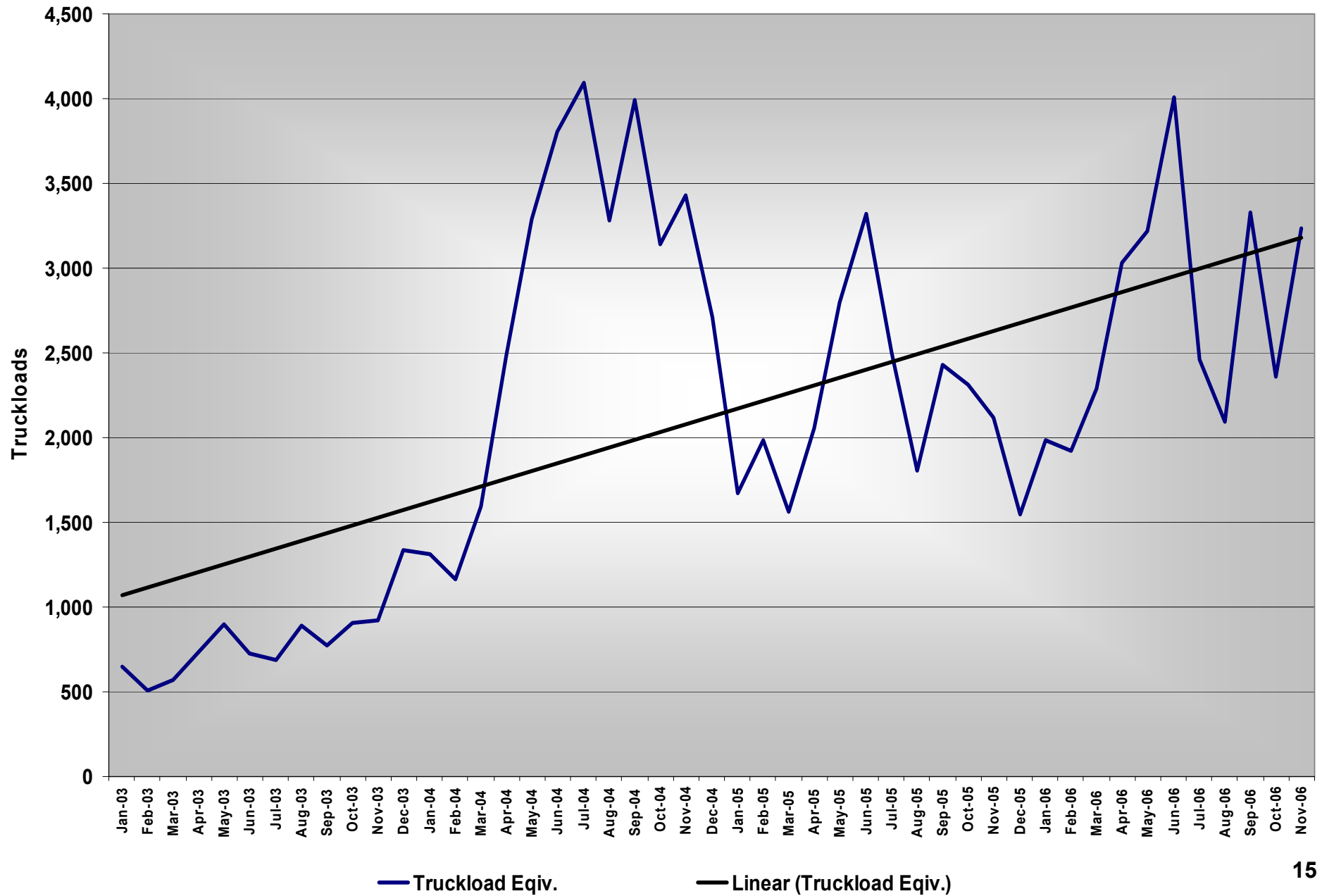
PVA Adhesive Cost Comparison

- 3 ply construction, 2 glue lines 4 X 8, PVA would cost \$30/msf (\$1.00 per sheet)
- 7 ply VC panel, 6 glue lines, 4 X 8, PVA would cost \$110/msf (\$3.52 per sheet)
- For an average kitchen this would translate into an additional cost of \$ 40.35*

* Calculated as an average price on 15 sheets with 67% VC and 33% 3 ply, for an up charge of $\$2.69 * 15 = \40.35

PIERS - January '03 Through November '06

Imported Hardwood Plywood from China

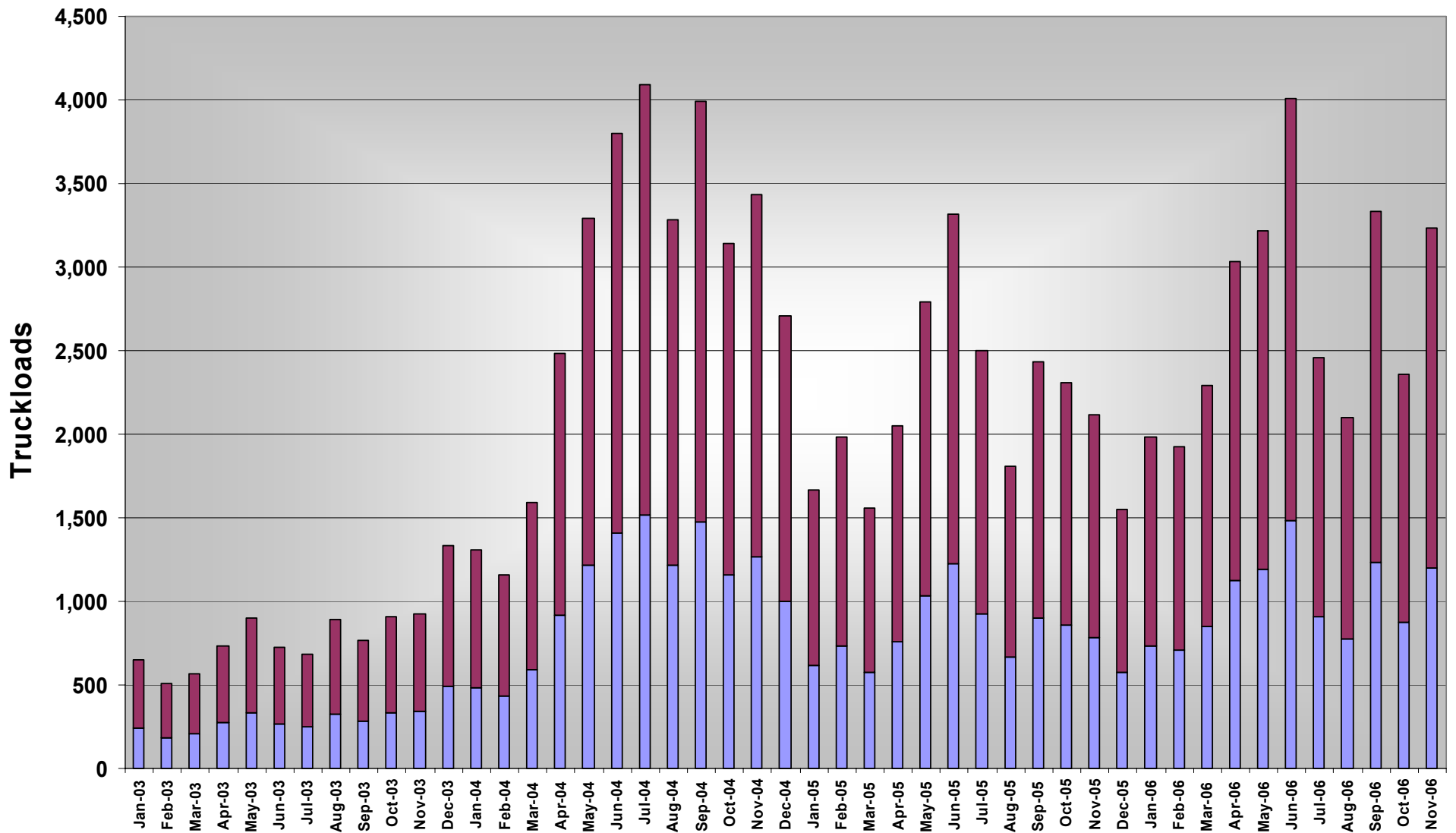


PIERS - January '03 Through November '06

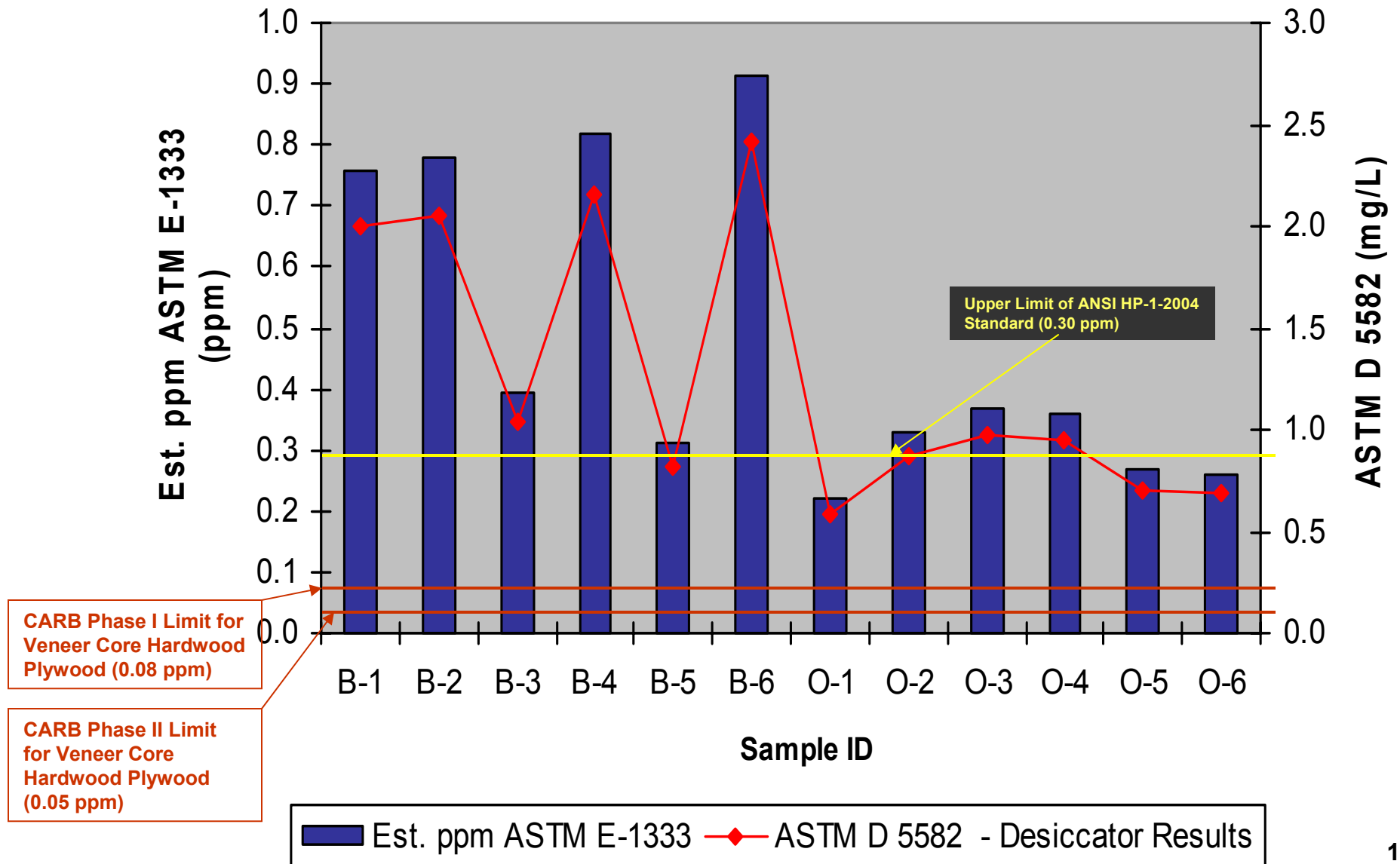
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Chinese Plywood to California

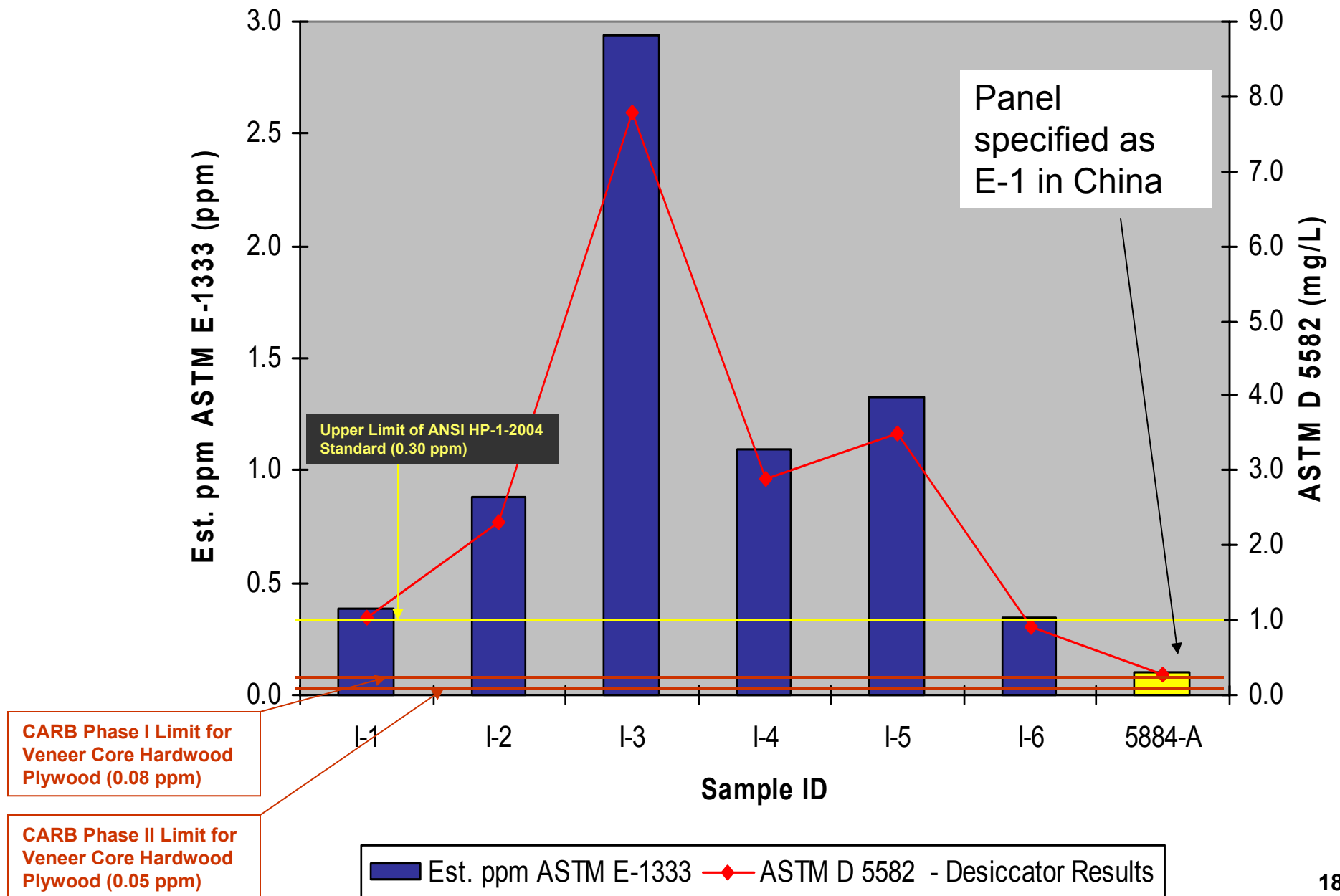
Other Ports



Desiccator Results and ASTM E-1333 Estimates Chinese Birch and Okume, Veneer Core



Test Results Chart – D 5582 Emissions
Imported Non E-1 VC samples sourced in Portland, OR



March 1, 2007

Bill Altman
Hardwood Plywood and Veneer Association
1825 Michael Faraday Drive
Reston, VA 20195-0789

Bill,

I wanted to let you and the HPVVA know about an important decision we at Columbia Forest Products have reached. With the intent of furthering a formaldehyde-free industry we have decided to make our urea formaldehyde-free, soy-based adhesive available, at a nominal cost, to all North American manufacturers.

We'd hoped this technology would permanently change the hardwood plywood industry for the better and it has done that. But it has also raised awareness of the overall air quality issue. Taking formaldehyde out of our manufacturing has been good for our customers, end users, employees and local communities. Now the rest of the industry can enjoy those same benefits.

We are in the process of determining how we will execute this and will keep you informed on our progress.

I hope you, like us, see this as a positive move forward for our entire industry. Please feel free to use this in any member communications.

Sincerely,



Phill Guay
VP of Corporate Strategy and Marketing

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