

*Hardwood & Softwood Kiln  
Emissions:  
An Update on Safety and Health  
Concerns*

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# Background

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- **Clean Air and Water Act**
- **1970- 1990 (Amended Several Times)**
- **10, 20, 30, etc Tons/year**
- **Haps list**

# **New England Drying Patterns**

**(Latest Data: 2004)**

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- **Softwoods: 1097 mmbf**
- **Hardwoods: 312 mmbf**
- **About 6 percent of U.S. Total**

# Volume of Major Softwood Species

(2004 Data in mmbf)

Eastern White Pine	647*
Spruce and Fir	507*
Ash	207
Birch	71
Hard Maple	449*
Soft Maple	334*
Red Oak	2,251
Aspen	119

\* Mostly Northeast

# **Kilns in New England**

## **(large mills only)**

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- **Number of Kilns in New England: >470**
- **Kiln types: >420 steam**  
**> 50 DH**

# Human Health Effects

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- Respiration
- Carcinogenicity

# Carcinogenicity

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# Carcinogenicity

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- **Cytotoxicity**
- **Mutagenicity**



*Air*

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# Northeastern Softwood Species

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Species	Pounds/Mbf
Balsam Fir	1.136
White Spruce	1.283
Red Spruce	1.224
Black Spruce	.867
Red Pine	.683

Usually 20 tons per year limit

# Typical VOC Levels

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**Conifers: 1-4 pounds per Mbf Typical**

**Extremes: .1 pound per Mbf**

**5 pounds per Mbf**

# VOC Levels Among Hardwoods

Source	Cherry	Hard Maple	Walnut	Y. Poplar	Ash	Red Oak
	-----lb./Mbf -----					
PA (I)	2.10	1.70				
PA (II)	0.87					
WV (I)		1.12				22.0
WV (II)	0.51	1.49				
KY/OH			3.26	0.71	0.71	
ME					2.01	
VA						5.91
NC						13.31
Mean	1.16	1.43	3.26	0.71	1.36	13.74

Variation remains a problem

# Relationship to MC Level

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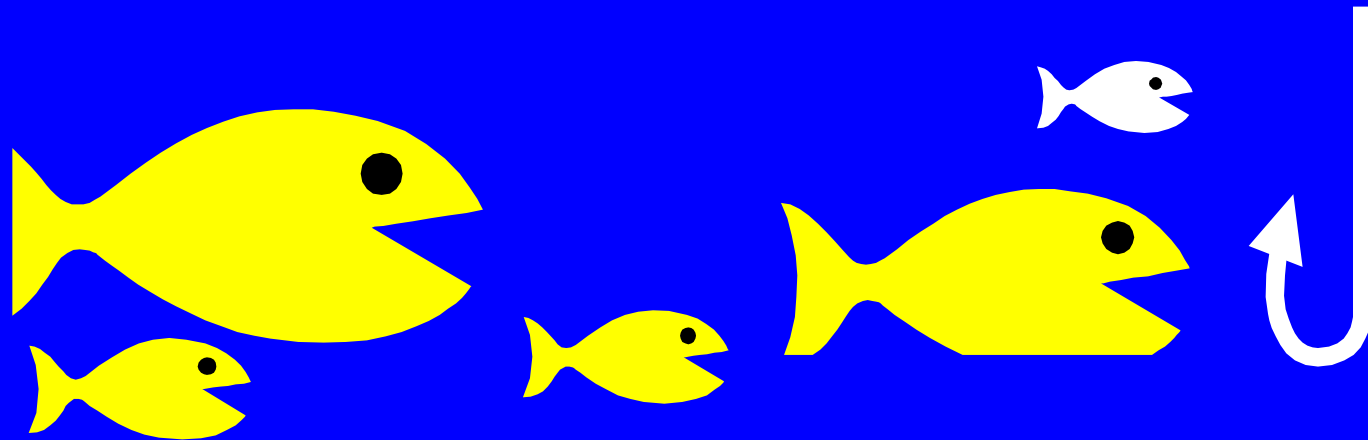
**Correlation: VOC Level with MC: .84**

Water

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# Fish Toxicity Testing

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Singer, J. T, R. W. Rice and L. Helyar. Forest Products Journal 1997

HAPS

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# Particulates

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# Particulates

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- Maine has the highest current asthma rate in the nation (CDC, 2001)
- Maine ranks higher than average for death rates from lung cancer and chronic obstructive pulmonary disease (American Lung Assoc., 2004)
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- Maine, which enjoys a relatively low toxics release inventory but still suffers from high rates of chronic lung disease and several forms of cancer (EPA, 2001; CDC, 2001; MDHHS, 1999).

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