Formaldehyde Use in Wood Based Panels  

How will formaldehyde standards adopted by the California Air Resource Board (CARB) in April 2007 affect current and potential forest biomass users?

This information is based on presentations by Brent Takemoto (CARB) and Brock Landry (Venable LLP) at the International Wood Composites Symposium in Seattle on March 28th 2007.

**Background**
California Air Resources Board (CARB) identifies toxic air contaminants (TAC) and sets minimum threshold levels. If there is no safe threshold level then control measures are to be based on best available control technology. CARB identified as formaldehyde as a TAC in 1992 with no safe threshold exposure level.

It is classed as a Tier 2 compound and is regarded as both an indoor and outdoor health risk. CA average concentration is above OEHHA (Office of Environmental Health Hazard Assessment of the California Environmental Protection Agency) chronic relative exposure level (REL) (3 µg/m3). Current average ambient levels result in 18 excess cancers per million.

CARB targeted composite wood products because of research by Battelle Labs (1996) and Zinn et al (1990) which identified urea formaldehyde resins used in these products as a significant source of personal formaldehyde exposure.

**Process**
Existing standards regarding formaldehyde emissions were reviewed. These included:
- United States  - Voluntary 1985 HUD standards
- New ASTM/ANSI specifications under review
- Europe   - E1 standards for plywood and particleboard
- Japan    - F*** standard (stringent, technology-forcing)
- F**** standard (represents “de minimis” levels)
Proposed standard
Proposed airborne toxic control measures (ATCM) standards (based ASTM E1333 – large chamber)

<table>
<thead>
<tr>
<th>Wood Product</th>
<th>HUD Std.</th>
<th>Phase 1 (ppm) 2009</th>
<th>Phase 2 (ppm) 2011-2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particleboard</td>
<td>0.30</td>
<td>0.18</td>
<td>0.09</td>
</tr>
<tr>
<td>Medium Density Fiberboard</td>
<td>None</td>
<td>0.21</td>
<td>0.11</td>
</tr>
<tr>
<td>- Thin MDF</td>
<td>None</td>
<td>0.21</td>
<td>0.13</td>
</tr>
<tr>
<td>Hardwood Plywood</td>
<td>0.20</td>
<td>0.08</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Phase 1 requirements are similar to the European E1 standard while phase 2 is similar to Japan’s F*** standard.

The standard will apply to MDF, particleboard and hardwood plywood. It will affect both the raw boards and finished products. It applies to producers, fabricators, importers and retailers.

It will be enforced through third party certification of manufacturers backed up with chain of custody certification through the supply chain.

The view of CARB is that the technical solutions already exist to meet the stringent phase 2 standards. They cite a number of companies using alternative resin systems in their products, eg MDI, soy based resins, PF, PVA, MUF with catcher (scavengers).

Claimed benefits
- Effective pollution prevention
- Reduces composite wood emissions by 20% (Phase 1) to 80% (Phase 2)
- Reduces overall exposure by 15% (Phase 1) to 40% (Phase 2)
- Achieves reductions in indoor settings where people spend most time
- Reduces lifetime cancer cases by 10-30 (Phase 1) to 40-100 (Phase 2)

CARB suggest that the standards do not eliminate the potential use of the existing resin systems. They present the growing market for eco-friendly building materials as an opportunity. Another advantage is the fact that the standards will stop the flow of high emitting (Chinese and other) imports.
Arguments against the proposed standard
It is argued that the standard is not comparable to existing international standards. It will be the toughest standard in the world. It is applicable to all application, there is no allowance for averaging and there are significant penalties for breaches. Importantly there are no allowances for treatment and barriers (or coatings) which appears to be an illogical approach when the focus is on tackling emissions.

The assessment of the risk of the occurrence of cancer cases is based on a theoretical model and it is alleged that 15 years of new science has been ignored.

There is concern that the standards will be expensive to meet and very difficult to enforce. There is a requirement for third party certification with chain of custody backed up with labeling. This results in a burden for the entire supply chain. CARB estimates that costs to industry will be $127m/yr while the industry suggests figures ranging from $500-$760m/yr are more realistic. Monitoring of compliance will be complicated with the need to deconstruct furniture and cabinets for testing.

Opponents suggest that the standard is poorly researched and has many flaws (eg importers get 6 months more time than domestic producers to comply). It is argued that there could be significant impacts on the industry due to the way that formaldehyde resins are part of the industry infrastructure (eg resin plants co-located with mills).

There are efforts (SB 509 –The Simitian Bill) by some manufacturers with proprietary technology to get even more stringent standards in place. This would lead to the effective withdrawal of formaldehyde based resins from the marketplace.

Affects on current and potential forest biomass users
There are only 2 panel manufacturers located in California but the impact of this standard will affect any facility supplying the California market. From a technical viewpoint, adapting or changing resin systems is possible but this is likely to lead to increased manufacturing costs. Certification of the supply chain will add costs to all businesses handling wood-based panels or products made thereof.

At present it is too early to say whether there will be significant negative impacts on the panel manufacturing industry. It is possible that certain manufacturers may decide that meeting the phase 2 standard would be too costly to justify investment. However, cleaning up the resin technology will have benefits for the industry in terms of how “green” it appears when compared to alternatives. The impact of the standard goes beyond California and may result in other similar standards being developed in other States. There is also the potential that it could reduce the import of cheap panel products from overseas that could have a positive impact on domestic producers.

Impacts on utilization of forest biomass will depend upon the longer term reaction of the industry to the standard (note that much material for panel-board manufacture comes from sawmill residues and construction and demolition waste). Currently the
implementation of this standard is not seen as having a significant impact on the utilization of biomass from federal lands.

**Further information**
CARB: [http://www.arb.ca.gov/toxics/compwood/compwood.htm](http://www.arb.ca.gov/toxics/compwood/compwood.htm)