



**Johns Manville**

*A Berkshire Hathaway Company*

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**VIA ELECTRONIC MAIL**

August 27, 2004

Ms. Dorothy Shimer  
Research Division, 5<sup>th</sup> Floor  
California Air Resources Board  
[ab1173@listserve.arb.ca.gov](mailto:ab1173@listserve.arb.ca.gov)  
1001 I Street  
Sacramento, California 95812

**RE: Comments on draft *Report in Indoor Air Pollution in California*  
(AB 1173, Keeley); [http://www.arb.ca.gov/research/indoor/ab1173/report\\_06-30-04.htm](http://www.arb.ca.gov/research/indoor/ab1173/report_06-30-04.htm)**

Dear Ms. Shimer:

Johns Manville (JM) is pleased to submit these comments on the draft ***Report On Indoor Air Pollution in California (AB 1173, Keeley)***; [http://www.arb.ca.gov/research/indoor/ab1173/report\\_06-30-04.htm](http://www.arb.ca.gov/research/indoor/ab1173/report_06-30-04.htm) dated June 2004. We understand that comments were originally due on August 20, 2004 but that the deadline was extended for parties notifying the California Air Resources Board (CARB) that they needed additional time. By e-mail dated August 16, 2004, JM notified CARB that it did need additional time and that JM's comments would be submitted by August 27, 2004. CARB acknowledged the JM request on August 16, 2004. Copies of both e-mails are enclosed.

As we explain more fully below, JM urges CARB to make more clear the health and well-being distinctions between formaldehyde-free products and products with added formaldehyde that are merely "low"-emitting or "green certified."

JM is a wholly owned subsidiary of Berkshire Hathaway and manufactures premium building products, roofing systems and engineered products. Employing over 8500 workers in 50 locations worldwide – including several plants in California - Johns Manville has a 158 year history of innovation. JM's website is found at <http://www.jm.com/>.

One of the most important building materials in a home or building is the insulation. Without the insulation, many of the other energy-efficient components will not perform as intended. A well-insulated home, particularly one that is insulated with fiber glass insulation, is one of the most cost-effective ways of saving energy and helping to reduce heating and cooling bills. The benefits from insulation far outweigh the cost, with the ratio of energy investment to energy

savings having a range of 12 to 1. This ratio means that for every British Thermal Unit (Btu) invested in the manufacture of thermal insulation, 12 Btu in energy savings are realized in the first year of service alone.

Insulation not only saves energy, a recent study by Harvard University's School of Public Health confirmed that insulation actually saves lives. In the "Existing Homes Study"<sup>1</sup> it was demonstrated that, if the 46 million existing single-family homes in the United States that have inadequate insulation were retrofitted with additional insulation to meet just the 2000 International Energy Conservation Code (let alone the 2004 IECC), the benefits would include 240 fewer premature deaths, 6,500 fewer asthma attacks and 110,000 fewer restricted activity days per year. This translates into a potential savings of \$1.3 billion per year in averted costs such as health care, and \$5.9 billion per year in additional savings associated with reduced energy consumption, paying back the initial cost of the insulation in about six years. The Study based the projected health benefits on annual energy savings of more than 800 Trillion Btu (TBtu), which resulted in lower emissions of fine particulate matter (PM<sub>2.5</sub>) and particle precursors (SO<sub>2</sub> and NO<sub>x</sub>).

In 2002 JM became the first and is still the only manufacturer to offer a complete line of formaldehyde-free building insulation. While all major manufacturers of fiber glass insulation make some formaldehyde-free products, only JM has converted its full line.

Glass fibers are inert and must be glued or "bonded" together to form a resilient batt that will keep its shape in a building cavity. In ordinary bonded fiber glass insulation the glass fibers are glued together with a formaldehyde-based binder. After our customers expressed lingering concerns about the health hazards of formaldehyde and after US EPA made findings regarding the hazardous nature of the emissions from fiber glass wool insulation manufacturing,<sup>2</sup> JM

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<sup>1</sup> Existing Homes: Levy, Jonathan et. al., "The Public Health Benefits of Insulation Retrofits In Existing Housing in the United States." Environmental Health, 2003 2:4

<sup>2</sup> U.S. EPA identified three hazardous air pollutants related to the binder used to make ordinary bonded fiber glass insulation: formaldehyde; phenol; and, methanol. As to the health hazards, EPA stated in the preamble to the proposed Clean Air Act Title III MACT regulation for the fiber glass industry that,

Exposure to formaldehyde, methanol, and phenol irritates the eyes, skin, and mucous membranes and causes conjunctivitis, dermal inflammation, and respiratory symptoms. Formaldehyde exposure has been associated with reproductive effects such as menstrual disorders and pregnancy problems in women workers. The EPA has classified formaldehyde as a Class B1, probable human carcinogen, on the basis of findings of nasal cancer in animal studies, and limited human data. Phenol has been shown to cause damage to the liver, kidney, cardiovascular system, and central nervous system in animal studies. Acute exposure to methanol (usually by ingestion) is well-known to cause blindness and severe metabolic acidosis, sometimes leading to death. Chronic methanol exposure, including inhalation, may cause central disturbances possibly leading to blindness.

62 Fed. Reg. 15227, at 15230 (March 31, 1997). Also found at: <http://www.epa.gov/fedrgstr/EPA-AIR/1997/March/Day-31/a7214.htm>. As described below, after JM moved its product line to a formaldehyde-free formulation, U.S. EPA presented JM with a letter of exemption from the MACT regulation applicable to the rest of the industry. (Copy enclosed.)

assembled a research team to determine whether a formaldehyde-based binder was really necessary for building insulation. The answer was no; formaldehyde-based binders are not necessary to achieve the thermal and acoustical performance required of fiber glass insulation. So, JM switched its entire line of building insulation to a formaldehyde-free formulation. It was just a smart thing to do – for our customers, homeowners, building workers, and the environment.

Not only does JM fiber glass building insulation save energy and lives, it also uses a high percentage of recycled material which further helps the environment. In addition to reducing demand on virgin resources, using recycled materials saves landfill space by diverting materials from the solid waste stream, and reduces the energy used, and pollution emitted, during the manufacturing process. In fact, JM products feature the highest average recycled content of all fiber glass insulation made in the US today – 25%. Importantly, JM also has an average of 20% post-consumer recycled content – or 250% greater than our nearest competitor. Post-consumer recycled content is important because U.S. EPA's Office of Federal Environmental Executive considers pre-consumer materials the same as virgin materials. The reason for this is only post-consumer materials have served their intended end use prior to their recovery for recycling.<sup>3</sup>

Concerning the draft Report, Johns Manville strongly endorses CARB's efforts to define the sources, health effects, and remedies to indoor air pollution. Certainly, CARB and JM are aligned in seeking ways to improve indoor air quality. However, we urge CARB to more strongly advocate source elimination especially for chemicals that are carcinogenic. For example, products that emit "little" formaldehyde should not be considered synonymous with products that emit no formaldehyde as you suggest in Report Section 5.1 on Source Control. Optimum indoor air quality can be achieved only by making progress toward elimination all sources of indoor air pollution, especially where emission-free products with equal performance are commercially available at competitive prices. This is especially true for formaldehyde for several reasons.

#### *CARB Now Formally Recommends Formaldehyde-free Fiber Glass Insulation*

After years of study, CARB recently updated the formaldehyde sections of its **Indoor Air Quality and Personal Exposure Assessment Program**.<sup>4</sup> An important part of that update is the new CARB guidelines entitled "Formaldehyde in the Home."<sup>5</sup> That guideline urges architects and homeowners to make smart choices when building or remodeling. Specifically CARB recommends the use of formaldehyde-free building materials. Such materials are more readily available today than just a few years ago and examples of formaldehyde-free materials include: gypsum board; some hardboard products; lumber; bricks, tile, etc.

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<sup>3</sup> See <http://www.ofee.gov/recycled/descript.htm>

<sup>4</sup> <http://www.arb.ca.gov/research/indoor/formald1.htm>

<sup>5</sup> <http://www.arb.ca.gov/research/indoor/formaldGL08-04.pdf>, August 2004.

Because formaldehyde emitted from insulation materials installed in the ceiling or walls can enter living spaces in the home, **CARB now formally recommends using formaldehyde-free fiber glass insulation too.**<sup>6</sup>

*IARC has Determined that Formaldehyde is a Group 1 Known Human Carcinogen*

In June 2004, the International Agency for Research on Cancer (IARC)<sup>7</sup> assembled an international team of scientific and medical experts to determine whether the cancer hazard for formaldehyde should be made more severe based on several recent studies that linked formaldehyde exposure to leukemia.

As part of the World Health Organization, IARC determines which chemicals and substances could cause cancer. IARC uses a matrix to rank each substance according to the strength of both human and laboratory animal evidence. IARC then places the substance in one of four Groups:

- Group 1 - known human carcinogen
- Group 2A - probable carcinogen
- Group 2B - possible carcinogen
- Group 3 - not classifiable as to carcinogenicity
- Group 4 - evidence of non-carcinogenicity

After the team of IARC experts reviewed the most recent science, they determined the evidence is now sufficient that exposure to formaldehyde causes a certain type of cancer in humans, not just in laboratory animals. According to the IARC classification matrix, this places formaldehyde in Group 1 - known human carcinogen - along with such substances as asbestos and benzene. According to the IARC press release:

. . . the expert working group has determined that there is now *sufficient evidence* that formaldehyde causes nasopharyngeal cancer in humans . . . The working group also found *limited evidence* for cancer of the nasal cavity and paranasal sinuses and "strong but *not sufficient* evidence" for leukemia. The finding for leukemia reflects the epidemiologists' finding of strong evidence in human studies coupled with an inability to identify a mechanism for induction of leukemia, based on the data available at this time.

IARC Press Release No. 153, June 15, 2004. The press release can be found on IARC's website at <http://www.iarc.fr/pageroot/PRELEASES/pr153a.html> and a copy of the release is enclosed for your information.

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<sup>6</sup> Id. at page 6.

<sup>7</sup> The IARC website is found at [www.iarc.fr](http://www.iarc.fr).

Some "Green-Label" products still contain measurable and potentially unhealthy amounts of added formaldehyde

With the recent proliferation of so-called "green" building materials, it can be difficult to distinguish between products for which real, substantive changes have been made from those products that have made no changes but nonetheless still make "green" claims. Many so-called "green building materials" actually contain measurable amounts of added formaldehyde. Unfortunately, this is also true for products that are "green-certified" by some organizations.

In reality, there is a significant difference between "green-certified" fiber glass insulation that allows significant formaldehyde emissions and formaldehyde-free fiber glass insulation. Some "green-certifications" will accept a fiber glass insulation product even if that product is made with a formaldehyde-based resin and even if that product will off-gas formaldehyde in quantities that would result in an indoor air concentration of 50 parts per billion (ppb).

There are two reasons why such "certifications" are not meaningful. First, to our knowledge, no changes have been made to the certified fiber glass insulation products in order to achieve the 50 ppb maximum. Second, and more importantly, 50 ppb is significantly higher than several health-based standards. Specifically, the 50 ppb "certification" level used by some "certifying" organizations:

- ***exceeds by a factor of nearly 400*** the California one in a million excess lifetime cancer risk. (See page 52 in the **Draft Report on Indoor Air Pollution in California**, [http://www.arb.ca.gov/research/indoor/ab1173/report/draft\\_report\\_6-30-04\\_final\\_s.pdf](http://www.arb.ca.gov/research/indoor/ab1173/report/draft_report_6-30-04_final_s.pdf));
- ***exceeds by a factor of 25*** the chronic reference exposure level (REL) established by the California Office of Environmental Health and Hazard Assessment. (See, [http://www.oehha.ca.gov/air/chronic\\_rels/pdf/50000.pdf](http://www.oehha.ca.gov/air/chronic_rels/pdf/50000.pdf));
- ***exceeds by a factor of 6*** the chronic minimal risk level (MRL) established by the Agency for Toxic Substances and Disease Registry (ATSDR). (See, <http://www.atsdr.cdc.gov/mrls.html>);
- ***exceeds by a factor of four*** the maximum allowable formaldehyde emissions to qualify for a bid under Environmental Standard 1350 on California state construction projects. (See page 8 at [http://www.chps.net/manual/documents/Sec\\_01350.doc](http://www.chps.net/manual/documents/Sec_01350.doc));
- ***exceeds by a factor of three*** the acceptable level of formaldehyde recommended for office and other workers during a normal 8-hour day by the National Institute Occupational Safety and Health

(NIOSH). (See, <http://www.cdc.gov/niosh/npg/npgd0293.html>); and,

- ***And even exceeds by a factor of 1.25*** the **Acute** minimal risk level established by the Agency for Toxic Substances and Disease Registry, ATSDR. Again, see <http://www.atsdr.cdc.gov/mrls.html>.

In contrast, switching to a formaldehyde-free composition is a true, substantive change for a fiber glass insulation products. JM's Formaldehyde-free fiber glass insulation products have been extensively tested by Berkeley Analytical Labs and those tests demonstrate that our formaldehyde-free products do not off-gas detectable amounts of formaldehyde, other aldehydes, and other VOCs.<sup>8</sup> While other products may achieve mere qualification under ES 1350, only JM's formaldehyde-free products have no added formaldehyde and hence make no contribution to formaldehyde loading in indoor air.<sup>9</sup>

*Encouraging the use of formaldehyde-free prevents hazardous air pollution*

Manufacturing plant locations that use formaldehyde-based binders generate significant emissions of formaldehyde and other hazardous air pollutants (HAPs) to the environment around the plant. Frequently, those formaldehyde emissions are treated by abatement equipment, which itself generates more pollution (especially greenhouse gases) and uses significant amounts of energy.

Johns Manville has chosen to take a different path. By switching away from formaldehyde-based binders we have used true pollution prevention in order to reduce our nationwide manufacturing HAP emissions by over 100 tons per year. So dramatic was the reduction that EPA determined that Johns Manville is exempt from the HAP regulation still applicable to makers of ordinary, formaldehyde-bonded fiber glass insulation.<sup>10</sup> A copy of that exemption letter is enclosed.

In conclusion, JM urges CARB to make the following changes to the final Report:

- affirm the importance of formaldehyde-free products to the health and well-being of homeowners and building occupants, including students;
- more clearly distinguish between formaldehyde-free products and products with added formaldehyde and measurable formaldehyde emissions; and,
- make a clear recommendation in favor of formaldehyde-free products that is as strong as the one in your recently published guideline "Formaldehyde in the Home."

<sup>8</sup> Berkeley Analytical Associates, Richmond, California, Test No. EMIT1038 November 17, 2003. The detection level in those tests was less than 1 ppb.

<sup>9</sup> See, <http://130.94.152.174/jme/schools/schools.asp> and <http://www.ciwmb.ca.gov/GreenBuilding/materials/Matrix.htm#Division7>.

<sup>10</sup> 40 CFR Part 63, subpart NNN, section 63.1380 *et seq.*

Dorothy Shimer, California Air Resources Board

August 27, 2004

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Please do not hesitate to call me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Tim Carey", with a long, sweeping horizontal line extending to the right.

Tim Carey  
Manager, Product Stewardship

Enclosures

- JM E-mail of August 16, 2004
- CARB e-mail of August 16, 2004
- U.S. Environmental Protection Agency's October 21, 2002 MACT exemption letter
- IARC's June 15, 2004 Press Release on Formaldehyde