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August 27, 2004

Via email: ab1173@listserv.arb.ca.gov

Dorothy Shimer
Research Division
Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Dear Ms. Shimer:

The Carpet and Rug Institute, representing the carpet manufacturing industry, appreciates the opportunity to submit written comments on the draft report "Indoor Air Pollution in California."

Please contact me by email (kmcintosh@carpet-rug.com) or phone (706/428-2105 or 706/428-2104) if you have any questions or desire any follow-up information.

Sincerely,

A handwritten signature in black ink that reads "E. Ken McIntosh". The signature is written in a cursive, flowing style.

E. Ken McIntosh
Senior Technical Director

Carpet & Rug Institute – Industry Comments
on
Draft Report - Indoor Air Pollution in California
A report to the California Legislature
submitted by the California Air Resources Board

General Comments:

- In the introduction, the report promises a summary of the “best scientific information available on indoor air pollution”. Instead, the document attempts to justify a pre-determined conclusion that indoor air pollution causes significant, deleterious human health effects.
- In order to adequately address the risks associated with indoor air pollution in California, the Air Resources Board should use the “best scientific information available” to construct an accurate profile of indoor air. The type and amounts of constituents in both a residential and commercial setting should be identified in order to establish actual exposure. The ARB should then determine the hazards associated with the constituents which – coupled with the exposure data - would allow for a comprehensive risk assessment.
- In general, carpet is mentioned a number of times, but usually referenced from a study of some sort. In order to take issue with the carpet reference, a discrediting of the particular study would need to be undertaken.
- In some places where “carpet” or “carpets” is used, “new carpet” is the correct term. This indicts carpet as a VOC emitter over its entire life. There is reliable proof that carpet is not a long-term emitter. When referencing carpet, it should be in the context of emissions from new carpet or the new carpet installation...
- This report goes a long way in sustaining the myth that carpet is a source of formaldehyde in the indoor environment. This is not true based on the colossal amount of testing that the industry has done through the CRI IAQ Green Label Testing Program over the last decade. In the chart on formaldehyde on 3 (Table ES-1) and again on page 28 (Table 2.1) under the formaldehyde pollutant section, carpet is not mentioned as a source; however, on pages 7 and 49 carpets are listed very prominently as an emitter.
- On page 40, it mentions a study in the first paragraph whereby the author says that “particles can become re-entrained in the indoor air when people walk or play on the carpeted surface”. There are other studies where even very active dancing and other such activities on carpeted surface did not get anything airborne and into the breathing zone. The report should mention hard surfaces, which several reliable reports show are much worse than a carpet surface which tends to hold on to the particles until removal.

- On page 56, there is mention of emissions rate of naphthalene and acetaldehyde exceeded 01350 guideline limits in one study. The source of this information is from a study that was seriously flawed. These emissions might have been from materials of the installation system.
- A lot of information is devoted to pesticides and lead that are tracked on to the carpeted surface where a small child might ingest some of it by mouth or hand to mouth. A possible scenario, but the same is just as likely with any type of floor covering with these sorts of contaminants in the indoor environment.
- In the introduction, the report promises a summary of the “best scientific information available on indoor air pollution”. Instead, the document attempts to justify a pre-determined conclusion that indoor air pollution causes significant, deleterious human health effects.
 - For example, the report begins by listing chemicals and substances that are assumed to be present in indoor air (Table ES-1, page 3). The assumption appears to be based on a list of products available for use in commercial and residential buildings. However, there are no data that indicate the prevalence of the products mentioned or measurements that actually identify the amount and types of chemicals in indoor air. In the same table (ES-1, page 3), the report lists potential health effects associated with the chemicals and substances that are assumed to be present in indoor air. However, the actual risk of experiencing any of these effects cannot be determined because the report lacks measured exposure information.
 - In another example, page 7 contains a statement that carpet is a source of formaldehyde emissions even though data later in the report (page 51) showed that formaldehyde emissions from carpet were below detectable levels.
 - In order to adequately address the risks associated with indoor air pollution in California, the Air Resources Board should use the “best scientific information available” to construct an accurate profile of indoor air. The type and amounts of constituents in both a residential and commercial setting should be established in order to establish actual exposure. The ARB should then determine the hazards associated with the constituents which – coupled with the exposure data - would allow for a comprehensive risk assessment.

Page 2

II. Health Effects of Indoor Pollutants

Comments: It seems unlikely that pollutants would “*often*” be elevated to harmful levels. We suggest the following change, “...extremely high indoor air pollution may cause a variety of impacts on human health, from irritant effects to respiratory disease, cancer and premature death. Indoor air pollutants can be elevated to levels that may potentially result in adverse health impacts.”

Page 3

Table ES-1 (p3); Table 2.1 (p28) -- In the first row / first column of these tables, phthalates are listed under POLLUTANT and Organic Chemicals. They are linked to the following potential health effects: cancer; eye, nose, throat irritation; possible worsening of asthma; headaches; at high levels; loss of coordination; damage to liver, kidney and brain.

Comments: For example, the report begins by listing chemicals and substances that are assumed to be present in indoor air (Table ES-1, page 3). The assumption appears to be based on a list of products available for use in commercial and residential buildings. However, there are no data that indicate the prevalence of the products mentioned or measurements that actually identify the amount and types of chemicals in indoor air. In the same table (ES-1, page 3), the report lists potential health effects associated with the chemicals and substances that are assumed to be present in indoor air. However, the actual risk of experiencing any of these effects cannot be determined because the report lacks measured exposure information.

Page 7 & 8

"Polycyclic Aromatic Hydrocarbons (PAHs) – PAHs, emitted from combustion sources such as cigarettes, woodstoves and fireplaces, include a number of known or suspected carcinogens. They have been found to adsorb onto particles in the air and deposit onto carpets, from which they can be re-suspended during vacuuming or other activity."

"Pesticides and metals - Pesticides are widely used and can cause adverse developmental and neurological effects at elevated exposure levels. Some are very persistent in the environment, lasting 20 or 30 years or more. Carpet dust from homes and schools have been shown to contain numerous residues of pesticides, lead, mercury and other long-lasting contaminants. This is of special concern for very young children, who spend time on the floor and put their hands in their mouths, because ingestion is often the primary route of exposure."

Comments: Mentioned again on page 37 in the report, the language under "Polycyclic Aromatic Hydrocarbons" seems to point the finger towards carpet when in fact, a hard surface floor can be several times worse than carpet. If both are maintained to the industry recommendations, these issues should be alleviated. If both are neglected, the carpet is more able to take the neglect and remove the dust/dirt by settling to the base where it is not easily accessible. The hard surface just allows it to stay on top, causing more exposure (especially to children playing on the floor).

The reference to "re-suspension from carpet" seems to point to the carpet as being the "source." The true "sources" are the combustion sources themselves and they are what needs to be addressed. Re-suspension of particles during vacuuming is directly related to the efficiency of the vacuum cleaner. CRI has the Green Label Vacuum Cleaner program that should be followed. See this link:

http://www.carpet-rug.com/drill_down_2.cfm?page=8&sub=9

Removing the word “carpet” here is critical. Use this language instead:

Dust in homes and schools have been shown to contain numerous residues of pesticides, lead, mercury and other long lasting contaminants. This is of special concern for very young children, who spend time on the floor, where dust originating from cigarettes, fireplaces and wood stoves may settle and put their hands in their mouths, because ingestion is often the primary route of exposure.

See this paper:

Luedtke, Alan E., [Floor Coverings, Dust and Airborne Contaminants, August 2003](http://www.flooringsciences.org/e-journal/0407/0407_Luedtke_Dust-Airborne-Contaminants.pdf)
http://www.flooringsciences.org/e-journal/0407/0407_Luedtke_Dust-Airborne-Contaminants.pdf

Page 5 -“It has been reported in a handful of studies that blood lead levels for small children correlate with lead levels in house and carpet dusts....It should be noted that reported associations were not indicative of cause and effect. The fact that carpet dusts explained only a relatively small percentage of the variance in the data (Clark et al.) suggests other factors had a role. Carpet dusts may serve as a marker for the lead burden of the environment as a whole. Research to date has indicated lead can be especially difficult to remove from carpet, attributable in part to lead residing with very fine particles (<1um). Therefore, lead in carpet dust may not be readily available for exposure.”

Page 9 – “Although soil capacity for carpet was potentially quite high, it was not unusual for the reported differences in accumulated soils to be less than ten times that of smooth floors.”

Page 21 –“Despite the fact that carpet typically carried higher burdens of contaminants than smooth surfaces, it was extremely rare to find a study that reported a statistically significant contribution for carpet of contaminants in the air.”

“There was a substantial amount of data that indicated small particles <5 microns were not easily re-suspended. Note that this was likely a positive from the standpoint of exposure to lead (Pb), pesticides, PAH’s and PCBs, which were associated predominantly with sub-micron particles.”

Comments: Also see these papers which are all linked from the first issue of The International E-Journal of Flooring Sciences, published by the International Flooring Sciences Resource Center:
<http://www.flooringsciences.org>

Berry, Michael, A., A Systems Modeling Approach to Assessing Carpet and Environmental Risk, August 2003

http://www.flooringsciences.org/e-journal/0407/0407_Berry_Assessing-Carpet-Environmental-Risk.pdf

Ryan, P. Barry, The Impact of Carpet on Indoor Air Quality and Health Effects: An Annotated Bibliography, October 2003

http://www.flooringsciences.org/e-journal/0407/0407_ryan_carpet-iaq-health-effects.pdf

Lewis, Roger D. and Causer, Simon, Retention and Removal of House Dust Contaminants from Carpet: Integrating our Knowledge of Source Dusts, Carpet Properties, and Carpet Cleaning for a Healthier Indoor Environment, August 2003.

http://www.flooringsciences.org/e-journal/0407/0407_Lewis_Retention-Removal-House-Dust-Contaminants.pdf

Berry, Michael A., Carpet in the Modern Indoor Environment Summary of a Science-Based Assessment of Carpet, October 2003

http://www.flooringsciences.org/e-journal/0407/0407_berry_carpet-assessment-summary.pdf

Page 14:

“Industry and professional guidelines include the American Society of Heating, Refrigerating, and Air-conditioning Engineers’ (ASHRAE) ventilation requirements for reassuring adequate indoor air quality, the Carpet and Rug Institute’s (CRI) Green Label Program, the Composite Wood Manufacturers’ voluntary formaldehyde limits, and a number of others. They vary in their degree of IAQ protection, but are widely used and generally have helped reduce indoor pollutants over the years.”

Comments: Need to mention Carpet and Rug Institute’s (CRI) new Green Label Plus enhanced program

http://www.carpet-rug.com/News/040614_GLP.cfm

Need to mention CA 01350

http://www.chps.net/manual/lem_table.htm

Need to mention Scientific Certification Systems’ Indoor Air Quality Product Certification Program (PCP)

<http://www.scscertified.com/iaq>

South Coast Air Quality Management District Rule # 1168 (for adhesives),

Need to mention Scientific Certification Systems’ Environmentally Preferable Product Certification

<http://www.scscertified.com/carpet>

Page 17 – Table ES3

Carpet is listed as a “source” next to the following pollutants: Formaldehyde, acetaldehyde, benzene derivatives, acrylates, naphthalene, phenol, other VOCs

Caution should be used when attempting to categorize items in order of highest priority. Carpet should not be in a higher priority category than cigarette smoking, paints, adhesives, etc. What are the sources for this information? They are not clearly cited. This table seems to insinuate that “all carpet” emits the listed chemicals and this is not true. Certain chemicals are more typical to specific kinds of carpet ---not ALL carpet.

Page 26

“Dampness, mold, dirty carpeting, and pest infestations are often components of substandard housing, each leading to associated health problems, especially allergy symptoms and exacerbation of asthma attacks in asthmatics.”

Comments: This seems to insinuate that all “carpet” is “dirty carpet.” The moisture, pesticides, pests themselves and “lack of proper maintenance” are the causes and sources. The wording here needs to be changed to:

Moisture infiltration resulting in dampness and mold, improperly maintained carpet, and pest infestations are often components of substandard housing, each can lead to associated health problems, especially allergy symptoms and exacerbation of asthma attacks in asthmatics.

Page 31:

“In another European study cited by Delfino, elevated levels of benzene and styrene were associated with respiratory infections in newborns at risk for atopic disease, and wheezing was related to house painting and carpet installation during the first year of life.”

It seems that selective information from this report is being reported. Did ALL of the homes where wheezing occur have new carpet? Did they ALL have new paint? If not, then this has been taken out of context. Most commercial carpet companies have now developed water-based adhesives that are low –emitting. This sounds like residential carpet that may have been applied with high emitting adhesives. It was also not necessarily subject to guidelines as strict as what it would be in California. Due to the fact this example is overseas, many of the factors make it a poor comparison to make “for a scenario in California”. This is an example of repetitive theme within this document for “carpet” being put into a broad category that does not apply to ALL carpet.

Page 34:

“Those pollutants are found in dry-cleaned clothing, ETS, cleaning agents, glued carpet, gasoline, and degreasers. The authors concluded that “Chemical concentrations resulting from ‘off-gassing’ from normal household activities and materials can result in a health risk estimate that exceeds the benchmark used at hazardous waste sites”.

Comments: Glued carpet is mentioned as one of the materials that off-gases pollutants above a risk threshold considered to be hazardous. Here is a quote from earlier in the paragraph: "Indoor VOC concentrations from two studies completed in the 1980s (Wallace, 1987; Cohen et al., 1989) were used to determine the level of risk associated with VOCs measured inside residences."

The data used are from a 1980s study. It would be wrong to assume that carpet manufacturers are using the same glues, adhesives, formulations as they used in the 1980s. This outdated study is extremely misleading today and is not representative of modern carpet installations.

Glued carpet is a vague term. With the assumption that you mean "carpet adhesive" when you say "glue", it is important to note that this section, like sections before it makes a broad blanket statement that is not applicable to ALL carpet or ALL carpet adhesives. While this may be an issue with some residential adhesive products (in other countries, as the study notes), not all carpet adhesives are high emitting. There are many low emitting water based adhesives available for commercial carpeting today, and they are widely used.

Pages 34 and 35:

"Identifying a cause for SBS has been elusive. Mendell (1993) conducted a review of the epidemiological literature related to SBS. In reviewing 32 studies, he found consistent findings linking SBS symptoms with air-conditioning, carpets, more workers in a space, Video Display use, and ventilation rates at or below 10 liters/second/person. With specific causes unidentified, Mendell stressed the importance of using prudent design, operation, and maintenance practices to prevent sick building symptoms."

Comments: The official definition of "Sick Building Syndrome" makes it clear that it is non-specific, meaning that it cannot be tied to any single source, yet this document proceeds to single out other "potential" sources simply as "sources." It also does not give the same detail on carpet that it does on the other things. Simply putting "carpet" here in this context is irresponsible and inappropriate.

Page 36:

"These particles become trapped in carpets and have been shown to persist for a very long time, due to the difficulty of removing all particles by vacuuming, and may be re-suspended into the air."

Comments: This statement is misleading, indicating that they persist in carpets longer than on other surfaces, and also insinuating that they only "persist" in carpet. A better way to say this would be:

These particles become trapped in/on building surfaces and have been shown to persist for a very long time, due to the lack of applying effective cleaning and maintenance procedures.

See the comments and references for Pages 7&8 above.

Page 40:

“Indoor surfaces such as carpets and draperies attract and re-emit particles (Thatcher and Layton, 1995, Kamens et al., 1991). Particle concentrations from carpets can be high even in homes where good cleaning practices are used. The particles can become re-entrained in the indoor air when people walk or play on the carpeted surface (Wallace 2000a; Roberts and Dickey 1995; Abt et al., 2000, Vette et al., 2001).”

Comments: Singling out carpet and draperies here is inappropriate and the particle concentrations are not “from the carpets.” They are emitted from other sources and end up on the carpets. Get rid of the particles—not the carpets.

It would be better to say this:

Soft or porous interior surfaces have the potential to attract particles that can potentially be re-emitted (Thatcher and Layton, 1995, Kamens *et al.*, 1991). Particle concentrations ~~from carpets~~ can be high even in homes where good cleaning practices are used. The particles can become re-entrained in the indoor air when people walk or play ~~on the carpeted surface~~ (Wallace 2000a; Roberts and Dickey 1995; Abt *et al.*, 2000, Vette *et al.*, 2001). The Solutia study disproved this theory.

It is obvious from the reported data in the study, good cleaning practice was not effective cleaning practice and should have been applied in the study.

Page 40:

“Particles in carpet pose an additional risk to children. House dust particles include vapors, metals, and semi-volatile chemicals, such as pesticides and some PAHs, that have their own toxic properties...”*

Comments: This is an unreasonable statement. These contaminants pose an additional risk to children regardless of the floor covering type. All surfaces where these contaminants are present can be a problem. Why pick on carpet?

“additional risk” ---additional to what?

It should be stated like this:

Particles in house dust, such as metals, and semi-volatile chemicals such as pesticides and some PAHs that have their own toxic properties...

*Vapors are not particles. You have stated that they are.

Page 49:

“Ozone generators can destroy microorganisms and gases, but only at concentrations unsafe for occupied spaces. In addition, ozone from ozone

generators can react with indoor surfaces, such as latex paint and carpet, or airborne chemicals, including the fragrance compounds from commercial air fresheners, to produce toxic and irritating byproducts such as formaldehyde...

Comments: The problem here is the ozone generator. The language translates the blame to the interior surfaces. This is not appropriate. We know of no scientific data supporting the allegation that formaldehyde is formed when carpet is exposed to ozone. Ozone generators can demean many other interior products in addition to paint and carpet.

Page 49:

"Formaldehyde is a pungent smelling gas emitted from numerous indoor sources. These include many building materials (especially pressed wood products), most carpets, composite wood furnishings, consumer products, personal care products and cosmetics, permanent pressed..."

Comments: It is not accurate to say that "most carpets" emit formaldehyde. There are peer reviewed research papers that clearly state formaldehyde is not in the carpet as manufactured.

Page 51:

"When modeling was conducted on emissions from acoustical ceiling panels, a carpet, medium density fiberboard, gypsum board, resilient flooring (non-rubber based), and thermal insulation, room concentrations were estimated to exceed 16.5 µg/m³ (13.5 ppb), the upper bound allowed for formaldehyde contribution from a single product under Section 01350 guidelines. The nine products with elevated emissions account for 11% of the items tested in this study. Formaldehyde was detected in additional product categories at lower levels."

Comments: Pages 50, 51 and 56: The study cited (CIWMB) had several problems with it. There was a lot of controversy about the testing methods, sampling methods and possibility of cross contamination due to chemicals from known materials showing up in samples that did not have those materials. This study not used unless proper justification can be made for the particular references, particularly to carpet. Otherwise, it is introducing severely controversial results.

According to the referenced CIMWB report, seven of the samples received for testing were carpet tiles and the rest were broadloom. Of the 13 samples, the date of manufacture was only known for eight samples. The samples tested ranged in age from 4-634 days. This is in direct conflict with Section 01350 which states the testing should be conducting in keeping with ASTM D5116-97, which clearly recommends that samples should be tested within five to seven days of manufacture. The unknown age and exposure history of the some of the samples presents unknown test variables, preventing the ability to draw firm conclusions from the test data, and therefore rendering the results and conclusions for the samples of unknown age to be unreliable.

The CIMWB report also made the assumption that since some of the products were obtained commercially and the manufacture date was unknown, that the situation would be more representative of those a consumer might acquire in the marketplace. While that assumption may be true for residential broadloom carpets, it is NOT true for the commercial carpet tile market where the majority of orders are made to order in specific quantities for specific customers. We believe the assumption of “real world” exposures due to unknown sample age was misguided in the CIMWB report.

ASTM Standard D5116-97 used for Section 01350 also clearly states that there must be chain of custody documentation and verification. There was no evidence in the CIMWB report of the chain of custody protocols used for the testing. The varied ages and means of sample collection also strongly suggested that no chain of custody was followed. It is Interface’s position that the sampling collection, chain of custody, and possibly even the sample identification were flawed.

The published results of the CIMWB study showed a sample identified by the Department of Health Services to be an Interface Flooring Systems sample. The report indicated that the sample contained the presence of 4-phenylcyclohexene (4-PCH), which is known to be emitted from SBR Latex. Carpet tiles do not contain SBR Latex and it was therefore not used in the manufacture of any of the products that Interface submitted for the CIMWB test. This indicates that there was a sample identification error or an issue of cross contamination from other material samples. That being the case, the test was flawed.

The CIMWB results went on to say that two test samples submitted by Interface failed to meet the Section 01350 requirements for indoor air emissions, which Interface believed to be wrong. On August 8, 2003, Interface submitted samples of the same products to an independent laboratory (Berkeley Analytical Associates) for testing under the Section 01350 protocol. Each sample submitted passed the Section 01350 requirements.

For the reasons aforementioned, it is the position at Interface and supported by the Carpet and Rug Institute, that the CIMWB study is an inappropriate reference to use in your report to the California Legislature.

Page 51:

Floor finishing materials such as carpet and vinyl flooring may also emit formaldehyde. In a study funded by the ARB, Hodgson (1999) measured the formaldehyde emissions of several flooring products. Results for formaldehyde emissions at 24 hours showed:

- Carpet emissions were generally below the limit of detection of 1 µg/m³.
- One carpet cushion had an emission rate of 8 µg/m²/hr.
- Seam tape applied to carpet had an emission rate of 5 µg/m²/hr.
- Emissions from five different sheet vinyl flooring samples were less than or equal to 4 µg/m²/hr.
- Adhesives applied to sheet flooring and cove base had emission rates ranging from 72 to 258 µg/m²/hr.

- When the vinyl flooring or coving was placed on top of the adhesive, the surface product served as a relatively effective barrier, causing a drop in emissions.

Comments: Carpet and vinyl are not the only two types of flooring that can emit formaldehyde. Why are they singled out? Looking further down, the study shows that carpet emissions were below the detectable limit. The first reference is misleading. The problem is not the “carpet.” It may have been the adhesive, or the cushion, or the seam tape, which may not have been CRI’s IAQ tested Green Label approved products..

Page 54:

VOCs include a variety of chemical properties and functional groups: alkanes, alcohols, esters, ethers, and aromatic compounds. Indoor sources of VOCs include building and furnishing materials such as carpet, paint, and vinyl flooring; consumer products such as air fresheners, adhesives, and cleaning agents; water treated with chlorine; dry-cleaned clothing; environmental tobacco smoke; plastic products, computers, and others.

Comments: VOCs are ubiquitous. VOCs result from simple things like breathing. This paragraph has singled out certain products. The better way to word this would be:

VOCs include a variety of chemicals such as: alkanes, alcohols, esters, ethers, and aromatic compounds. Potential indoor sources of VOCs include building and furnishing materials such as carpet, paint, and vinyl flooring; consumer products such as air fresheners, adhesives, and cleaning agents; water treated with chlorine; dry-cleaned clothing; environmental tobacco smoke; plastic products, computers, and others.

Page 56:

Most recently, emission testing funded by CIWMB indicates that building materials potentially can emit enough VOCs to produce potentially harmful levels (Alevantis, 2003). Several products exceeded the Section 01350 guideline levels as follows:

- Carpet exceeded the emission rate limits for naphthalene and acetaldehyde.

Comments: Harmful levels of what??

See comments on CIMWB study above.

In another study, Hodgson (1999) identified 17 toxic air contaminants in the emissions from carpet, vinyl flooring, and latex paint. These toxic compounds are routinely emitted to the indoor environment, particularly in new or recently remodeled homes and offices. Table 2.6 contains a list of TACs identified by Hodgson in building material emissions. In addition to TACs, all of the bonded urethane carpet cushions emitted butylated hydroxytoluene (BHT), an irritant, and all carpet samples emitted 4-phenylcyclohexene (4-PC), the compound largely responsible for new carpet odor.

Comments: The Hodgson (1999) study indicates that all carpet samples emitted 4-PC. This chemical is known to be emitted from one particular class of carpet, not all carpet types. SBR Latex is the main source of 4-PC.

Table 2.6. Toxic Air Contaminants in Building and Finishing Materials

Carpet and Cushion

Toluene m,p-Xylene Toluene
m,p-Xylene Ethylene glycol m,p-Xylene
o-Xylene 2-(2-Butoxyethoxy)ethanol o-Xylene
Styrene Formaldehyde Styrene
Ethylene glycol Acetaldehyde 1,2,4-Trimethyl benzene
Formaldehyde Naphthalene
Acetaldehyde Acetophenone
Acetophenone Phenol
2-(2-Butoxy)ethanol Formaldehyde
Ethylbenzene Acetaldehyde
Tetrachloroethane
Naphthalene
Phenol

Comments: It is obvious that only a few kinds of carpet were tested here. The VOC emissions associated with certain types of carpet with different intended uses are being mixed. Tests of one or two specific kinds of carpet are being generalized to the whole.

See comments on CIMWB study above.

Page 64:

House dust mites, cockroaches, and animal dander are all known allergens for sensitive individuals. House dust mites are microscopic organisms that live on human skin cells and other organic material. Consequently they are found in carpets, bedding, and sofa cushions.

Comments: See this paper:

Luedtke, Alan E., [Floor Coverings, Dust and Airborne Contaminants, August 2003](http://www.flooringsciences.org/e-journal/0407/0407_Luedtke_Dust-Airborne-Contaminants.pdf)
http://www.flooringsciences.org/e-journal/0407/0407_Luedtke_Dust-Airborne-Contaminants.pdf

Page 7: Referring to Munir et al, Luedtke reported, "They also included data which separated mite allergen loading in rooms with and without carpet...Bedrooms were significantly higher than living rooms (p,0.01). Carpet was not significantly different from hard surfaces in allergen concentration per gram of dust."

Page 9: “Although soil capacity for carpet was potentially quite high, it was not unusual for the reported differences in accumulated soils to be less than ten times that of smooth floors.”

Page 19: “As indicated earlier, loadings of dust mite allergen can range widely in dusts from carpet, upholstery, and bedding, but airborne levels do not appear to correlate....Although carpet has frequently been identified as a nest for dust mites, it does not appear that it plays a major role in airborne exposures.”

Page 21: “Despite the fact that carpet typically carried higher burdens of contaminants than smooth surfaces, it was extremely rare to find a study that reported a statistically significant contribution for carpet of contaminants to the air...There was no correlation between dust mite allergen loads in carpet and airborne concentrations.”

Page 65:

Two classes of widely used insecticides in the U.S. are the organophosphates and pyrethroids, both are neurotoxins. Neurological signs resulting from acute toxicity may include nausea, headaches, dizziness, and general weakness. Pesticides are often measurable in house dust and carpet dust; levels of contamination are discussed below. The effects of pesticides on children are a particular concern because their behavior can lead to greater exposure than to an adult. Children spend time on the floor where they contact dust that may contain pesticides. The hand-to-mouth behavior of young children may lead to ingesting pesticides.

Comments: House dust and carpet dust are the same thing. It is house dust that ends up in the carpet. The carpet does not generate the dust. Other “sources” create the dust that can compromise the carpet. By calling it “carpet dust” it is alluding that the carpet generates the dust. This is not true.

See comments on pesticides in carpets above.

Luedtke, Alan E., [Floor Coverings, Dust and Airborne Contaminants, August 2003](http://www.flooringsciences.org/e-journal/0407/0407_Luedtke_Dust-Airborne-Contaminants.pdf)
http://www.flooringsciences.org/e-journal/0407/0407_Luedtke_Dust-Airborne-Contaminants.pdf

Page 68:

Mean concentrations of all detectable pesticides in carpet dust ranged from 0.01 µg/g to 15.4 µg/g. The mean concentrations for chlorpyrifos and diazinon in carpet dust were 5.8 µg/g and 1.7 µg/g, respectively.

Comments: Once again, the carpet does not generate the dust. The dust is generated by other sources, so it is not “carpet dust.” This should be redone to say:

Mean concentrations of all detectable pesticides captured in the carpet ranged from 0.01 µg/g to 15.4 µg/g. The mean concentrations for chlorpyrifos and diazinon found captured in the carpet dust were 5.8 µg/g and 1.7 µg/g, respectively.

See comments on pesticides in carpets above.

Luedtke, Alan E., [Floor Coverings, Dust and Airborne Contaminants, August 2003](http://www.flooringsciences.org/e-journal/0407/0407)
<http://www.flooringsciences.org/e-journal/0407/0407> [Luedtke Dust-Airborne-Contaminants.pdf](#)

Page 69:

Much of the lead present in indoor air appears to result from the infiltration of lead particles in outdoor air. Tracked-in and infiltrated lead dust can accumulate in carpets that can serve as a reservoir for lead-laden dust (U.S. EPA, 1997a). Research has shown that lead-dust loadings and concentrations per unit mass of dust are correlated with blood-lead levels, but no causal effect can be inferred from this association. Children's mouthing behaviors and activities that put them in direct contact with lead-contaminated surfaces increase their probability for exposure to lead by ingestion.

See comments on pesticides in carpets above.

Luedtke, Alan E., [Floor Coverings, Dust and Airborne Contaminants, August 2003](http://www.flooringsciences.org/e-journal/0407/0407)
<http://www.flooringsciences.org/e-journal/0407/0407> [Luedtke Dust-Airborne-Contaminants.pdf](#)

Page 82

Section 3.1.2 Deaths From Volatile Organic Compounds (VOC) Exposure.
This section contains a statement, "The risk from many other carcinogens also found in indoor air and house dust, such as acetaldehyde, PAHs other than B(a)P, *phthalates other than DEHP*, and asbestos."

Comments: We have never seen data showing phthalates as a major constituent of indoor air. It is our understanding, that if present in indoor air, concentrations would be at extremely low (negligible) levels that would pose no harm to human health. Therefore, we do not believe that phthalates should be classified or listed as a Major Indoor Air Pollutant with such effects.

It is also unrealistic to refer to phthalates as a single class – all having the same properties. Phthalate plasticizers vary widely in chemical composition, physical properties and toxicological properties.

There is no evidence that phthalate plasticizers are off-gassed or emitted from carpet, including vinyl-backed carpet. This is confirmed by VOC results contained in the Building Material Emissions Study for both carpet and resilient flooring. Only high molecular weight plasticizers with a low degree of volatility and a high degree of permanence are utilized in commercial carpet. Plasticizer emissions have never been detected in the hundreds of VOC emission tests conducted by independent laboratories during the past 10 years. These emission tests are conducted by independent laboratories using sophisticated laboratory equipment capable of detecting chemical levels in the part per billion range. It is also likely that phthalates emissions from other vinyl building products are extremely low.

Furthermore, there is no scientific basis to link phthalates with asthma. The Institute of Medicine (IOM), established by the National Academy of Sciences, investigated leading causes of childhood asthma and found insufficient information to link plasticizers in indoor air to childhood asthma.¹ Phthalates have a low vapor pressure and thus a low tendency to escape into air.

There is no scientific evidence that shows phthalates are responsible for adverse health effects in children or adults, including human reproductive or developmental problems.

- Members of the Consumer Products Safety Commission (CPSC) in February 2003 unanimously denied a petition to ban or restrict of the use of vinyl in toys. Commissioner Mary Sheila Gall stated, "Consumers may have a high level of assurance that soft plastic products pose no risk to children." Based on the findings of a specially convened panel, the CPSC staff also concluded that children who mouth toys containing DINP face "no demonstrated health risk" of cancer, reproductive or developmental effects.²
- The American Council on Science and Health convened an independent expert panel to evaluate the scientific evidence regarding potential health risks associated with Di(2-ethylhexyl) phthalate (DEHP) and Diisononyl Phthalate (DINP) plasticizers. Based on a review of currently available data, the Panel concluded in 1999 that DEHP is unlikely to pose a health risk to even highly exposed humans, confirming that DINP and DEHP are safe and pose no harm to adults or children.³
- The final summaries and full European Union (EU) Risk Assessment reports on diisononyl phthalate (DINP) and diisodecyl phthalate (DIDP) plasticizers conclude that no risk reduction measures are necessary for any current use of DINP or DIDP. The final reports requires adoption by the EU's Member States Article 15 Committee, which is expected in 2004. The EU considered a variety of potential human and environmental exposures to the chemicals, and compared those exposures to levels at which effects have been seen in laboratory animals. Because of the large margin between the effects levels and the potential exposures, the final RA reports conclude that no risk reduction measures are necessary for any current use of DINP or DIDP. Specifically for DINP, for which concerns have been expressed about children's exposure via toys, the risk assessment found that exposure from consumer products, including toys, are unlikely to pose a risk to adults, infants or newborns. The final reports maybe found at the European Council for Plasticisers and Intermediates (ECPI) web site at www.dinp-facts.com and www.didp-facts.com.

¹ "Clearing the Air: Asthma and Indoor Air Exposures," Institute of Medicine, 2000

² Report to the U.S. Consumer Products Safety Commission by the Chronic Hazard Advisory Panel on Diisononyl Phthalate (DINP), June 2001, page 124. Details from the report are available on the CPSC website: <http://www.cpsc.gov/LIBRARY/FOIA/Foia01/os/dinp.pdf>

³ "A Scientific Evaluation of Health Effects of Two Plasticizers Used in Medical Devices and Toys: A Report from the American Council on Science and Health," American Council on Science and Health, June 22, 1999.

- The May/June issue of the International Journal of Toxicology contained a paper detailing research results from AdvaMed's Neonatal DEHP study.⁴ The study showed the "no effect" level in newborn rats expose to intravenous doses of DEHP is at least fifteen times higher than assumed from previous studies. The AdvaMed paper indicates that's rats are much less sensitive to DEHP intravenous exposure than previously assumed. AdvaMed, the Advanced Medical Technology Association, is the largest medical technology association in the world, representing more than 1000 innovators and manufacturers of medical devices, diagnostic products and medical information systems. AdvaMed has taken an active role in investigating the safety of medical devices manufactured by its members.
- The National Toxicology Program (NTP) Center for the Evaluation of Risks to Human Reproduction (CERHR) convenes Expert Panels (EP), composed of independent scientific and health experts, who review certain chemicals for potential effects on human reproduction or development. In 1999 and 2000, an EP conducted a review of seven phthalates (BBP, DBP, DEHP, DIDP, DINP, DnHP and DnOP). Six of the seven monographs on phthalates have now been issued by NTP and can be found at <http://cerhr.niehs.nih.gov/reports>. They concluded, in most cases, "minimal" to "negligible" concern for the potential for phthalates exposures to result in human reproductive or developmental effects. It is the EP's policy to express its conclusions for all chemicals reviewed as "degrees of concern," based on a semi-quantitative relationship between "No Observed Adverse Effect Levels" (NOAELs) in animal studies and estimated levels of human exposure. As a reference point, concerns expressed as "minimal" or "negligible" mean that estimated human exposures were at least three orders of magnitude below the NOAELs from animal studies. The NTP reports provide further evidence that speculation about risks to the general public from products containing phthalates is unjustified by the science. The work of the CERHR EP was completed before direct measurement data was available from the CDC. Those CDC data show phthalate exposures to be generally below the levels estimated by the CERHR Expert Panel and in some cases much lower. For example, the CDC data for di(2-ethylhexyl) phthalate (DEPH), when converted to actual exposure levels, showed the average DEHP exposure in humans to be more than 30 times lower than the safety levels set by the EPA.

Table ES-1 (p3); Table 2.1 (p28)

In the first row / first column of these tables, phthalates are listed under POLLUTANT and Endocrine Disrupters. They are linked to the following potential health effects: mimic or block natural effects of hormones (estrogen and others); developmental abnormalities.

⁴ Cammack J., White R., Gordon D., Gass J., Hecker L., Connie D., Uma S., Friedman M., Echels C., Yeh T., Wilson D. Evaluation of intravenous exposure to di(2-ethylhexyl) phthalate in male neonatal rats. The International Journal of Toxicology 2003; 22: 1-16.

first paragraph “A recent study (Rudel et. al., 2003) found numerous endocrine disrupting compounds in indoor air and dust obtained from 120 homes in Cape Cod, Massachusetts. The most abundant compounds in air included bis(2-ethyhexyl) phthalates (DEHP) (a plasticizer used in children’s toys, shower curtains, raincoats, shoes and floor tiles):....”

Comments: There is no scientific evidence that supports phthalates are endocrine disrupters. Phthalate plasticizers have not been proven to be endocrine disrupters, however, they have been unfairly included on endocrine disrupter lists. Unfortunately, chemicals are included on these lists, without first questioning the basis for the lists or inclusion on the lists. More unfortunate is that once a list is published, it tends to be perpetuated. Once chemicals appear on lists, they often tend to stay on the lists, regardless of the quality of the initial review process or any subsequent data that is developed.

The major phthalates in commerce today do not interfere with estrogen or androgen receptors when tested in laboratory animals. That is, they do not activate the male or female hormone receptors and they cannot prevent activation by natural hormones. Although **high** doses of some phthalates can interfere with normal sexual development in rodents, no effects were seen at low doses. These "no effect doses" were far above those that any human being would be exposed to under any realistic scenario. Therefore, we do not believe that phthalates should be classified or listed as a endocrine disrupters.

- In a significant two-year, highly sophisticated study reported to the Society of Toxicology in 2003, researchers found that high doses of di(2-ethylhexyl) phthalate (DEHP) administered to juvenile marmoset monkeys (which are much closer to humans in both physiology and development than rodents) from weaning to sexual maturity had no negative effects on male reproductive organs, suggesting that those effects are specific to rodents only. As marmosets are primates, the research indicates that the reproductive effects observed in rodents may not be relevant to humans. The report has been provided to the U.S. Food and Drug Administration (FDA) and maybe included it in its review as it prepares its final guidance on the use of medical devices containing DEHP.

EPA does not currently have a list of known endocrine disrupters, however, congress passed the Food Quality Protection Act in 1996, requiring that EPA initiate an Endocrine Disrupter Screening Program (EDSP) to screen pesticide chemicals and environmental contaminants for their potential to affect the endocrine systems of humans and wildlife. EDSP is currently proceeding on three fronts:

- EPA's Assay Development and Validation team is leading the scientific and technical testing needed to validate the endocrine disruptor screens and tests.

- EPA's Priority Setting workgroup is developing and refining the approach EPA will use to select and prioritize chemicals for endocrine disruptor screening and testing.
- EPA's Regulatory Activities workgroup is developing the regulatory processes and procedures needed to implement the EDSP.

More information can be found at: <http://www.epa.gov/scipoly/oscpendo/index.htm>

In light of the continuing uncertainties and highly publicized concerns about endocrine-active chemicals, the World Health Organization International Programme on Chemical Safety (WHO IPCS) conducted an objective, global assessment of the state of the science relative to endocrine disruption. In its August 2002 report, the WHO IPCS states that "Analysis of the human data by itself, while generating concerns, has so far failed to provide firm evidence of direct causal associations between low-level (i.e., levels measured in the general population) exposure to chemicals with [endocrine disrupting effects] and adverse health outcomes." The report concludes: "studies examining [endocrine disrupting chemical]-induced effects in humans, have yielded inconsistent and inconclusive results, which is responsible for the overall data being classified as weak." The report does point out, however, this classification "is not meant to downplay the potential effects of [endocrine disrupting chemicals]" and instead "highlights the need for more rigorous studies." The WHO report concluded that more information and research were needed. <http://ehp.niehs.nih.gov/who/chpt8.pdf>